SYSTEMS EQUIPMENT ENGINEERING

NO. 14 LOCAL TEST CENTER

Western Electric Company
INCORPORATED

Systems Equipment Engineering - Standards-West Systems Coordination

LOCAL TEST CENTER

CONSISTING OF

LOCAL TEST DESK NO. 14

REPAIR SERVICE DESK NO. 2

TEST SUPERVISOR'S PRIVATE DESK

AND

ASSOCIATED EQUIPMENT

D. C. WILLS
Senior Staff Engineer

JANUARY 1964

PREFACE

As long as subscriber lines are subject to the ravages of time and the elements, not to mention the human element, there will be a demand for maintenance personnel and local test center facilities for maintaining their efficient operation.

The # 14 Local Test Center described herein was developed to meet this demand and has been standard equipment since 1929. It has been installed at more than 1200 locations throughout the country and represents an estimated aggregate investment of more than thirty million dollars.

New developments in telephone switching have necessitated progressive changes in these facilities over the years, and with the introduction of the Electronic Switching System, Data Transmission, and recent advances in the telephone art, additional modifications and perhaps the introduction of entirely new testing facilities may be expected in the future.

In spite of these advances, however, and should the present testing facilities be superseded by new facilities, the No. 14 Local Test Center will continue to be used for many many years as evidenced by its predecessor, the No. 12 Local Test Center, many of which are still in service some 35 years after it was superseded by the No. 14 Local Test Center. Thus, there will be a continuing demand for modifications, additions, re-locations and new installations of the No. 14 Local Test Center for many years to come.

The purpose of this book is to provide a resume of engineering information pertaining to the Local Test Center, coordinated with supplementary data and explanatory information for convenient Systems Equipment Engineering reference.

D. C. WILLS

TABLE OF CONTENTS

		PAGE
SECTION I	LOCAL TEST CENTER	4
SECTION II	NO. 14 LOCAL TEST DESK	10
SECTION III	NO. 2 REPAIR SERVICE DESK	163
SECTION IV	TEST SUPERVISOR'S PRIVATE DESK	188
SECTION V	TALKING FACILITIES	196
SECTION VI	OTHER EQUIPMENT LOCATED IN THE LOCAL TEST CENTER	208
SECTION VII	REFERENCES AND MISCELLANEOUS DATA	221

SECTION I

LOCAL TEST CENTER

		PAGE
A.	GENERAL	5
B.	TYPICAL VIEWS	6-8
C.	TYPICAL FLOOR PLAN	9

SECTION I

LOCAL TEST CENTER

A. GENERAL

The Local Test Center is designed to provide repair service and testing facilities for maintaining efficient operation of subscriber line and outside plant equipment of central offices located in the same building and in outlying buildings within the testing area.

Prior to 1929, this service was provided by Local Test Desk No. 12 and Repair Service Desk No. 1. These facilities were originally designed to test Panel, Manual or Step-by-Step offices located in the same building with the desk. The capacity of this equipment was very limited and in 1929 it was superseded by Local Test Desk No. 14 and Repair Service Desk No. 2 to provide improved testing features, greater capacity and more flexibility. A number of No. 12 Local Test Desks are still in service and many have been modified for testing distant No. 1 and 5 Crossbar Office lines.

The current standard Local Test Center consists of the following desks:

1. No. 14 Local Test Desk, comprising 1 to 20 positions.
2. No. 2 Repair Service Desk, consisting of 1 or more writing shelves and associated card files.
3. Test Supervisor's Private Desk (optional)

Other equipment such as Extension Alarm Cabinets and Teletype-writer for Automatic Line Insulating Test Circuit, etc. may also be located in the Local Test Center.

The Local Test Center is usually located in a separate room in the central office building, but may be installed in the terminal room, switch room, or in a building without a central office, and is operated by the Plant Department of the Telephone Company.

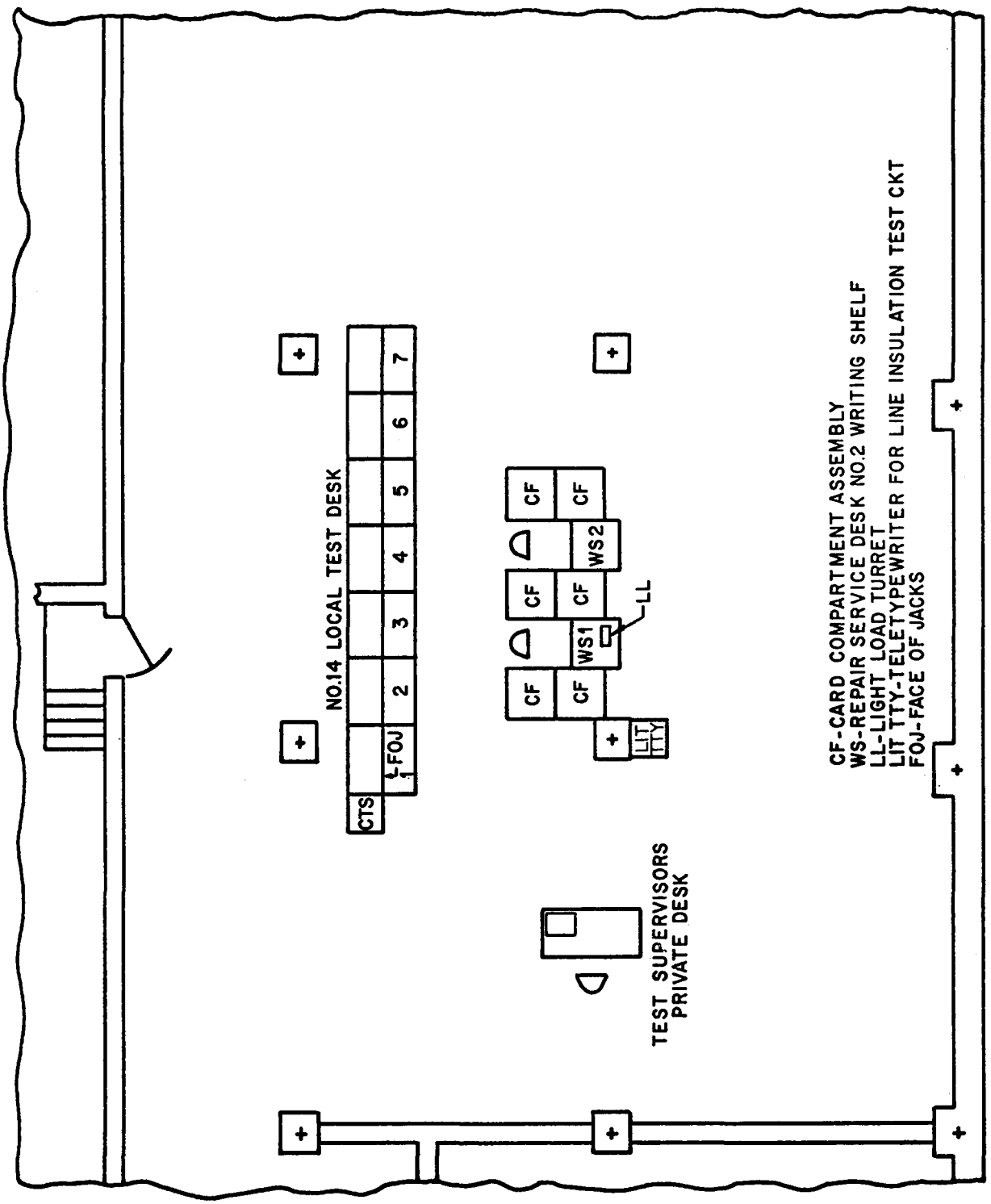
General view of the Initial Installation of No. 14 Local Test Center installed in New York City in 1930.

View of a Local Test Center showing a Three Position Repair Service Desk with six card compartments in the foreground and a No. 14 Local Test Desk in the background.

View of a Local Test Center showing the No. 14 Local Test Desk with the Repair Service Desk in the right background.

View of a Local Test Center showing a Two Position No. 14 Local Test Desk with a small capacity cable turning section and a Single Position No. 2 Repair Service Desk with two card compartments.

Local Test Center showing a partial view of a lineup of No. 14 Local Test Desk with a large capacity cable turning section and repair service card compartment assemblies in the foreground.



TYPICAL FLOOR PLAN
LOCAL TEST CENTER

SECTION II

NO. 14 LOCAL TEST DESK

		PAGE
A.	GENERAL	14
	1. Operating Range	14
	1.1 Conventional Testing	14
	1.2 Remote Testing	14
	2. Typical Views	16
	3. Composition of Lineup	19
	3.1 Supervisory and Light Load Position	19
	3.2 Regular Test Position	19
	3.3 Wheatstone Bridge Position	20
	4. List of J Drawings	24
	5. Compatibility of New and Old Positions	26
	6. Floor Plan Data	29
B.	FRAMEWORK	30
	1. Section Framework & Assembly	30
	2. Cable Turning Section	30
	3. End Panels	31
	4. Angle Section	31
	5. Keyshelf Assembly	31
	6. Finish	32
C.	EQUIPMENT	39
	1. Position Equipment	39
	1.1 Rear Equipment	39
	1.2 Front Equipment	42
	2. Numbering	44
	2.1 Position Numbering	44
	2.2 Mult Numbering	44
	2.3 Panel Numbering	45
	2.4 Jack Numbering	45
	2.5 Number Plates for Test Cords	46
D.	CABLING	47
	1. Local Cable	47
	2. Switchboard Cable	47
	2.1 Shop Formed Cable	48
	2.2 Type of Cable	48
	3. Cable Racks	49
	4. Illustrations	50

	PAGE
E. CIRCUIT FEATURES	56
1. General	56
1.1 Circuits Located In Position	56
1.2 Circuits Appearing in Jack Field	56
1.3 Circuits Located on Relay Rack	56
1.4 Block Diagram of LTD Circuits	57
2. Primary and Secondary Test Circuit	58
2.1 Description	58
2.101 Primary Cord	59
2.102 Secondary Cord	59
2.103 Sounder Cord	60
2.104 Position Volt-milliammeter	60
2.2 Establishing Connection to Subs Line	66
2.201 Patching	66
2.202 Operator	66
2.203 Direct Pulsing	66
2.3 Pulsing	66
2.301 "B" Switchboard Operation	66
2.302 Dial Pulse Operation	67
2.303 MF Key Pulse Operation	68
2.304 Extra Numbers (No. 1 X-Bar)	69
2.4 Testing Features	71
2.401 Line Insulation Breakdown Test	71
2.402 Receiver Off Hook Tone Application	72
a. Graduated Howler	72
b. 400A Tone Generator	73
2.403 Dial Speed Test	75
a. 51 Type Dial Tester	75
b. Meter Type Dial Tester	78
c. Dial Testing Not Required	79
2.404 TOUCH-TONE Subset Test	80
2.405 Coin Control Test	83
2.406 Coin Trunk Test	83
2.407 Permanent Signal Release	84
2.408 Conductor Identification Tone	84
2.409 Tube Type Subset Test	85
2.410 Relay Type Subset Test	86
2.411 Condenser Type Subsets	86
2.412 Metallic - AC Voltage - 60V Scale	87
2.413 Electronic Voltmeter	88
2.414 Distant Office Testing	89
2.415 Extension of Test TRK Range to 1500 Ohms	90
2.416 Test Trunk Ringing	93
2.417 Dialing on Subscribers Line	94
2.418 TOUCH-TONE Pulsing on Subs Line	95
2.419 Remote Testing	96
2.420 Framework Ground	99
2.421 Variations in Location of Apparatus	100

PAGE

E. CIRCUIT FEATURES (Cont'd)

2.5 Test Batteries 101
2.501 For Wheatstone Bridge Position 101
2.502 For Test Position 101
2.503 For Each 8 Positions 101
a. 116V+ 102
b. 20V, 100V, 166V, 200V 102
c. 116V- 102
2.504 For Entire Lineup 102
a. Booster Battery 102
b. Auxiliary Power Ringing 102
2.505 Location of Batteries 103
a. For 8 or Less Positions 103
b. For More Than 8 Positions 103
2.506 Specification Drawings 103
2.507 Special Combination 104
2.508 Dry Battery Data 105
2.6 Test Circuit Modification Data 109

3. Wheatstone Bridge Circuits 113
3.1 Wheatstone Bridge Cord Circuit 113
3.101 Open Location Test 114
3.102 4 Cycle Interrupter 114
3.103 Automatic Varley 3 Test 114
3.104 Voltmeter Bridge Test 115
3.2 Wheatstone Bridge Test Trunk Circuit 116
3.201 Separate Jacks vs Reg TST Jacks 116
3.202 Sleeve Resistance 117

4. Primary Ringing Circuit 117

5. Secondary Ringing Circuit 117
5.1 Table of Circuits & Compatibility 119
5.2 Types of Lines & Ringing 120
5.3 Auxiliary Power Ringing Circuit 122

6. Telephone Circuit 123
6.1 Trunk Key and Lamp Circuit 123
6.2 Trunk Jack and Lamp Circuit 124
6.3 Talking Cord (TC1) (TC2) 124
6.4 Ringing Key 124
6.5 Code Ringing Lines 125
6.6 Monitoring 125
6.7 Out Going Call Circuits 125
6.8 Incoming Call Circuits 126
6.9 Service Observing 126
6.10 Compatibility of Old and New Circuits 126

PAGE

E. CIRCUIT FEATURES (Cont'd)

7. MDF Loud Speaker 127
7.1 Desk End 127
7.2 Frame End 127
7.3 Method of Operation 135
7.4 Old Type Loud Speaker 137
7.5 Compatibility of Old and New Circuits 139

8. Position Clock 141
8.1 Synchronous Clock 141
8.2 Impulse Clock 141

9. Auxiliary Signal and Flashing Circuits 143
9.1 Auxiliary Signal Circuit 143
9.101 Current Standard 143
9.102 Old 144
9.2 Flashing Circuit 145
9.201 Current Standard 145
9.202 Old 145
9.3 Compatibility of Aux Sig & Flashing Circuits 146

F. TEST TRUNKS AND CONNECTING CIRCUITS 147

1. Common Systems 150

2. Step-by-Step 155

3. Panel 156

4. No. 1 Crossbar 157

5. No. 5 Crossbar 158

6. No. 1 Electronic Switching System 159

7. Circuits Using Test Train in Common With LTD 160

SECTION II

NO. 14 LOCAL TEST DESK

A. General

The No. 14 Local Test Desk is a universal desk designed to provide facilities for testing subscriber lines in Manual, Panel, Step-by-Step and No. 1 and No. 5 Crossbar and Electronic Switching offices. Its function is to facilitate the location of trouble and to expedite restoration of service when it has been interrupted. The desk may serve only the office or offices located in the same building (non-centralized) or offices located in a number of distant buildings as well as those in the same building (centralized).

1. Operating Range

The maximum operating range of the No. 14 Local Test Desk is as follows:

1.1 Conventional Testing - Over Metallic Test Trunks

	Trk Loop Res	Subs Loop Res	Total-Desk to Subs Sta
Since 1954	1500 Ohms	1500 Ohms	3000 Ohms
1936 - 1954	750 Ohms	1500 Ohms	2250 Ohms
1929 to 1936	750 Ohms	750 Ohms	1500 Ohms

1.2 Remote Testing - Over Regular Telephone Facilities or a CX, DX or Carrier facility

	Desk to Remote Office	Subs Loop Res
Range	Unlimited	* 1500 Ohms

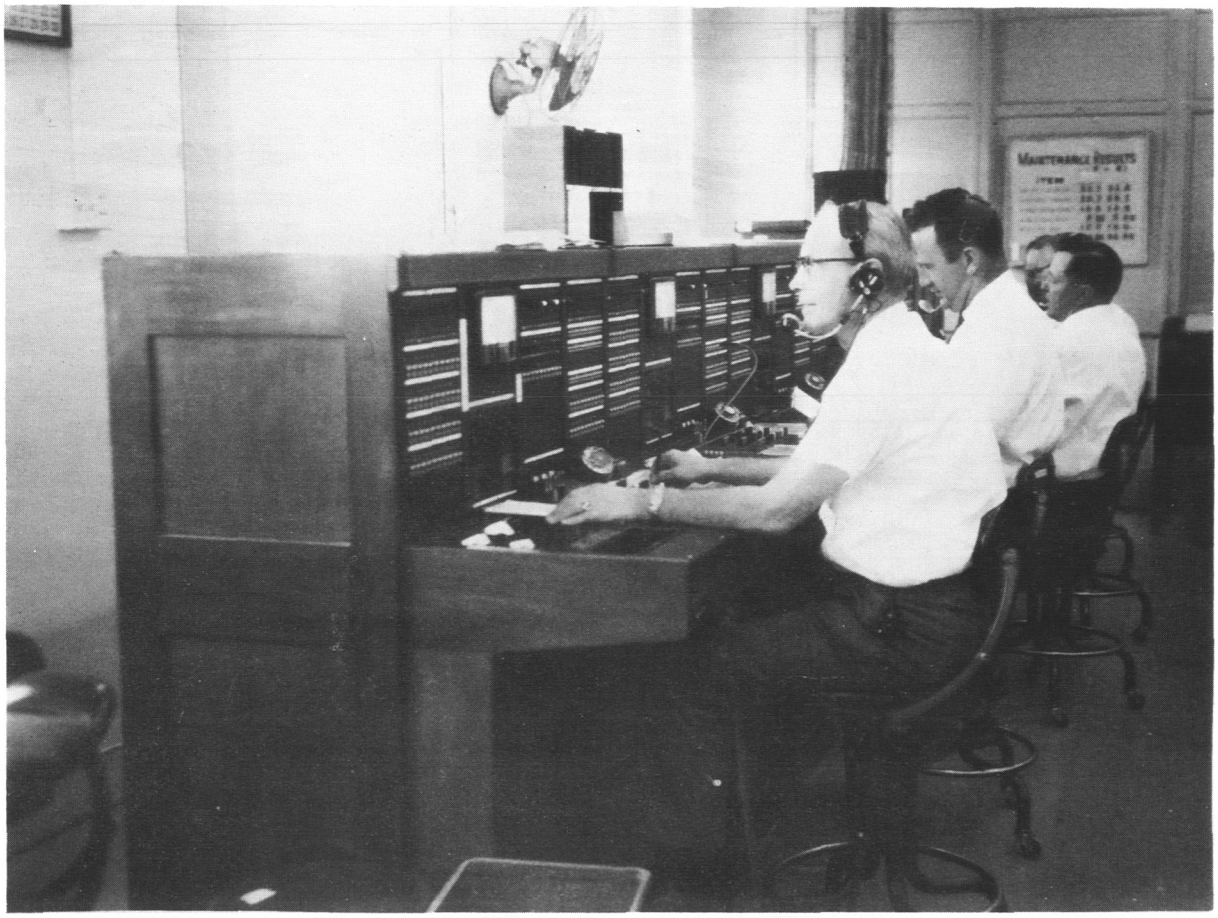
* Range as of 1963

4. COMPLETE LIST OF J DRAWINGS FOR NO. 14 LOCAL TEST DESK

	Drawing	Equipment	Iss Date	MD Date	Repl by
*	J95002A-1	Tst Position	5-27-29	6-10-30	J95002A-2
*	A-2	"	5-28-30	5-18-31	A-3
*	A-3	"	5-18-31	11-23-31	F-1
*	B-1	Supv & LL Pos (Used with A-1)	5-27-29	6-10-30	B-2
*	B-2	" (Used with A-2)	5-23-30	5-18-31	B-3
*	B-3	" (Used with A-3)	2-13-31	11-23-31	G-1
	C-1	Howler Unit	5-30-29	4-3-31	J93003R-1
	D-1	Breakdown Tst Unit	5-17-29	4-4-31	P-1
	E-1	WB Test Panel (Supl to A-1)	5-17-29	6-10-30	J95002E-2
	E-2	" (Supl to A-2)	5-22-30	5-18-31	E-3
	E-3	" (Supl to A-3)	2-13-31	11-17-31	E-4
	E-4	" (Supl to F-1-2)	11-6-30	10-18-35	E-5
	E-5	" (Supl to F-3-4)	4-19-32	2-26-40	F-5
**	F-1	Tst Position	10-22-31	5-11-31	F-2
**	F-2	" (Nbr Chgd to F-3)	9-25-32	10-25-35	F-3
**	F-3	"	10-25-35	4-14-37	F-4
**	F-4	"	2-12-37	2-26-40	F-5
**	F-5	Tst, WB or LL Position	1-18-40	(Redrawn) Date not available	F-6
**	F-6	"	7-11-40	"	F-7
**	F-7	"	1-10-43	"	F-8
**	F-8	"	10-18-47	"	F-9
**	F-9	"	12-30-49	"	F-10
**	F-10	"	8-25-50	9-26-53	F-11

Two position local test desk showing small CTS.

Two position No. 14 LTD showing end panel on growing end and PBX alarm cabinet on top of position 2.



View of a 5 position No. 14 LTD.

View of a 7 position No. 14 LTD.

View of a 7 position No. 14 LTD showing Wheatstone Bridge in foreground.

3. NO. 14 Local Test Desk Lineup

The No. 14 Local Test Desk is constructed of single position sections. The desk may consist of only a single position or two or more positions may be placed in line to form a test desk lineup. For cabling reasons, the maximum capacity of a lineup is limited to twenty positions.

The positions may be divided into three general types as follows:

3.1 Supervisory and Light Load Position

This position, usually located at the head end of the lineup, is used by the supervisor under normal traffic conditions or by one man during periods of light load when the other positions are not occupied. It differs from the regular test position in that it has access to all of the trunks in the lineup. In order to accommodate the extra trunk appearances, all of the talking trunks appear in the front equipment as jack ended instead of key ended trunks and are answered by means of talking cords and keys designated TC1 and TC2. Monitoring jacks are also available for monitoring on other positions from this position. This type of position is used only in large installations. The typical front equipment arrangement is shown on ED-90231-10.

3.2 Regular Test Position

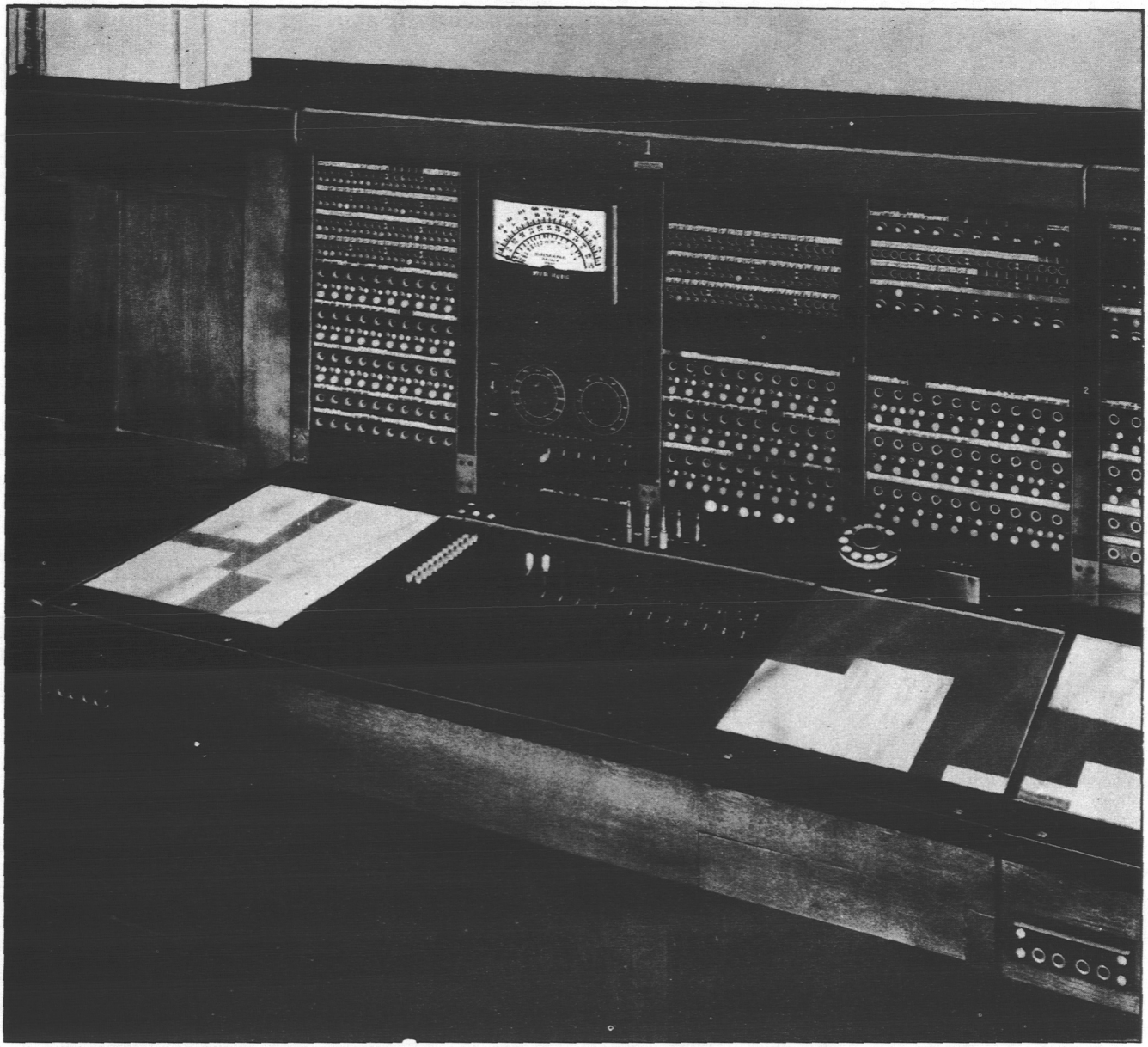
A regular test position is characterized by 29 talking key circuits and a ringing key located at the top of the jack field above the regular test trunks and miscellaneous equipment.

The jack field equipment is generally multipled on a one or two position basis. These positions are used for general testing. The typical front equipment is shown on ED-90208-10.

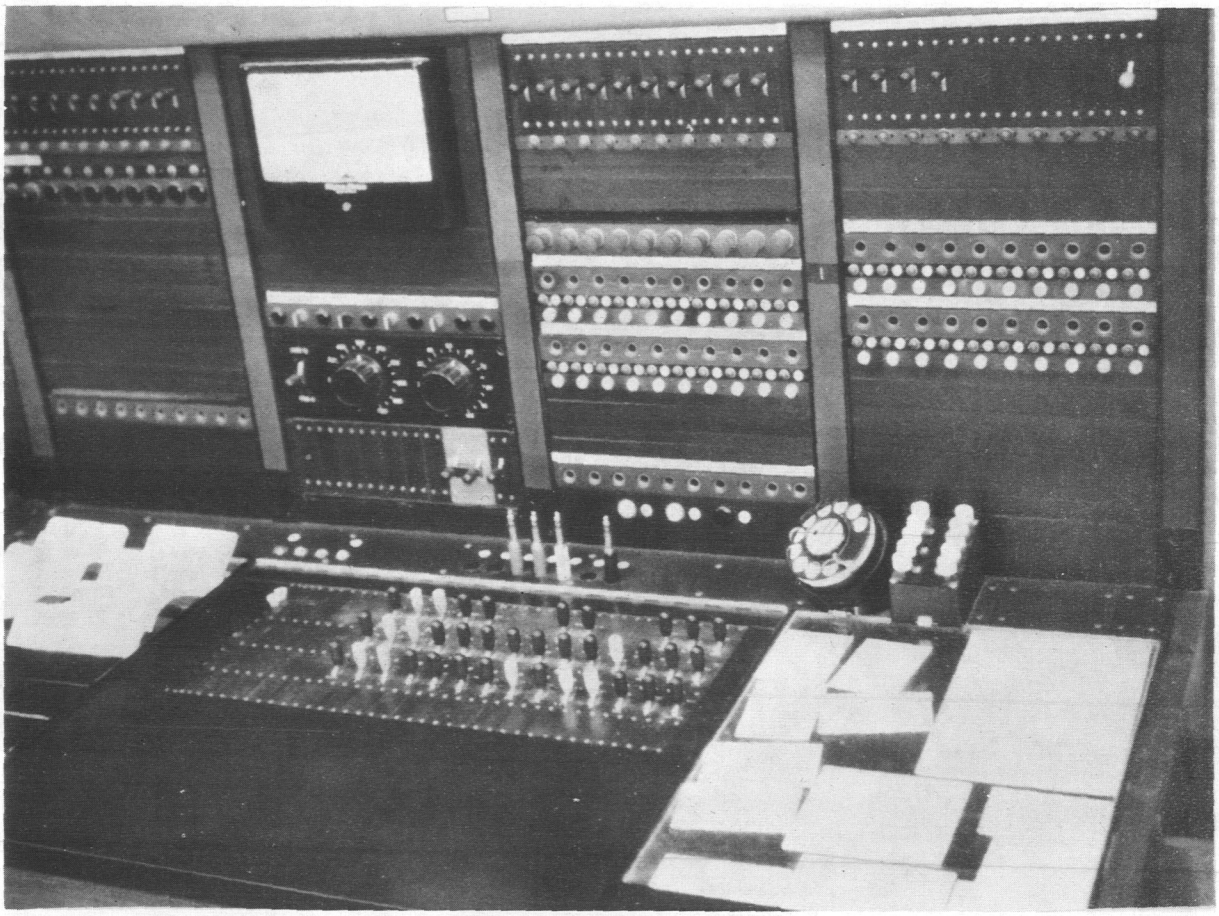
When more than 29 talking trunks are required additional jack ended talking circuits and the TC1 and TC 2 cords are sometimes provided in the regular test positions. This arrangement, although used extensively has not been standardized by the A. T. & T. Co. and is considered "Special".

3.3 Wheatstone Bridge Position

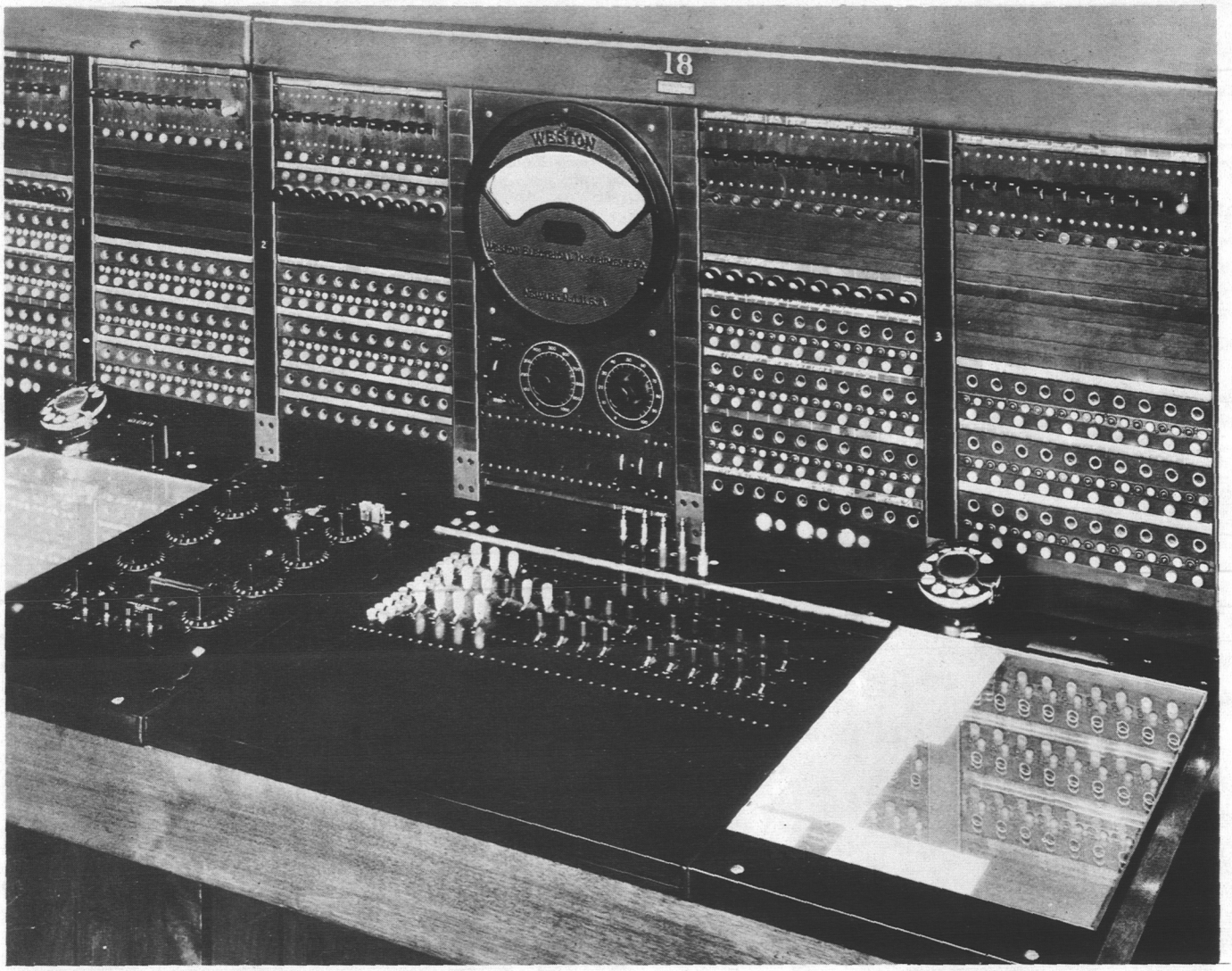
A Wheatstone Bridge position is the same as a regular test position except that in addition to the regular equipment it is equipped with a Wheatstone Bridge cord circuit and Wheatstone Bridge test trunks and is used for locating cable faults as well as for general testing. A lineup of test desk usually contains one Wheatstone Bridge position, but may contain none or several depending upon local practices. The front equipment is shown on ED-90208-10.



Supervisory and Light-load Position and
Cable Turning Section



Regular test position.



Wheatstone Bridge position with round meter - Initial Installation of No. 14 Local Test Desk - 1930.

	Drawing	Equipment	Iss Date	MD Date	Repl By
**	J95002F-11	Tst, WB or LL Pos	1-5-53	12-12-56	J95002H-1, J-1, K-1
**	G-1	Supv & LL Pos(Used with F-1)	10-22-31	5-11-33	G-2
**	G-2	" (Nbr Chgd to G-3) (Used with F-2)	9-23-32	10-25-35	G-3
**	G-3	" (Used with F-3)	10-25-35	4-14-37	G-4
**	G-4	" (Used with F-4)	4-9-37	2-26-40	F-5
***	H-1	Position Equipment	3-9-56	When Rlsed	H-2
***	H-2	"	6-25-64	Std.	-
***	J-1	Rear Equipment Unit (For H-1)	3-9-56	When Rlsed	J-2
***	J-2	" (For H-2)	6-25-64	Std.	-
	K-1	WB Rear Eqpt Unit(For H-1 & H-2)	3-9-56	Std	-

* Test Cord Circuit SD-90053-01

** Test Cord Circuit SD-90497-01

*** Test Cord Circuit SD-95612-01

5. Compatibility - New and Old Positions

Equipment orders for local test desks may call for various combinations of new and old equipment as follows:

a. A new lineup consisting of:

One or more new positions.

* One or more reused positions.

* Some new and some reused positions.

b. An addition to an existing lineup involving the addition of:

New Positions.

Reused positions.

Some new and some reused positions.

c. The addition or removal of test, talking circuits, loud speaker trunks, etc. to meet changing traffic conditions.

d. Modification existing equipment to provide features not originally provided.

e. Moving a lineup to a new location to provide room for new CO equipment.

* Reused positions generally require modification to add features required for the new location.

Compatibility of new and old positions is shown in the following table.

COMPATIBILITY OF NO. 14 LOCAL TEST DESK POSITIONS

ITEM	Initial Position of Lineup	Position Which May be Added			Rating of Comb.	Lamp Voltage		Aux Sig Ckt	Flashing Ckt
		J-95002H		Reused J-95002A,B,G or F (24V Req'd)		Cord Ckt (H)(BD)(DT) Lamps	Trunk Lamps in JK Fiels		
		With 48V OPT	With 24V OPT						
1	J-95002H With 48V OPT	Yes	No	No See Note 5	Std	48V	48V	SD95735-01	SD95725-01 or Misc Int Fr
2	J95002A,B,G or F (24V)	No	Yes	Yes	A & M Only	24V See Note 3	24V See Note 3	SD90628-01 See Note 2	SD90084-01 or Misc.Int See Note 2
3	J-95002H With 24V OPT	No	Yes	Yes	A & M Only	24V See Note 3	24V See Note 3	SD95735-01 See Note 2	SD95725-01 or Misc.Int See Note 2

NOTES

1. Item 1 is standard for new installations.
   Item 2 covers additions to existing 24V installations or a new lineup of reused positions.
   Item 3 covers a mixed lineup where new initial positions are followed by reused positions.

2. When the relay rack equipment is in place, the existing Aux Sig SD90628-01 and flashing ckt SD90084-01 should be retained. SD90084-01 is arranged to flash 24V lamps only.
   When the relay rack equipment is to be furnished new, Aux Sig Ckt SD95735-01 and Flashing Ckt SD95725-01 are recommended. These circuits serve both LTD and RSD. Do not mix new and old AUX and FLASHING CKT in same test center.

3. In items 2 & 3, 24V lamp options must be provided in J95002H for Receiver Off-Hook Tone (Howler), Dial Test and Breakdown Test Lamps and 24V Lamps are recommended for Test and Talking Trks. However, when starting a new lineup where 24V power is limited, 48V Lamps may be provided in the front equipment for Test and Talking Trunks on a (SPL) job basis. The talking trunk lamps in the LTD, RSD and Tst Supv Private Desk should be of same voltage.

COMPATIBILITY OF NO. 14 LOCAL TEST DESK POSITIONS

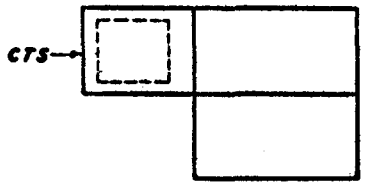
4. 48V 4 Cycle interrupter SD95778-01 is not compatible with J95002A,B,G or F. When any WB Pos is in this series 24V 4 cycle interrupter SD95301-01 should be provided when open location test is required.

5. J95002A,B,G and F have 24V relays and lamps and 48V transmission and can be used only in offices where 24V Bat Supply is available. Conversion of these positions to J95002H is possible but is uneconomical and is not recommended due to the excessive engineering and modification work involved. When these positions are to be reused in an office where 24V supply is not available, it is recommended that the Tel. Co. provide a small 24V power plant or order new positions and use the 24V positions elsewhere.

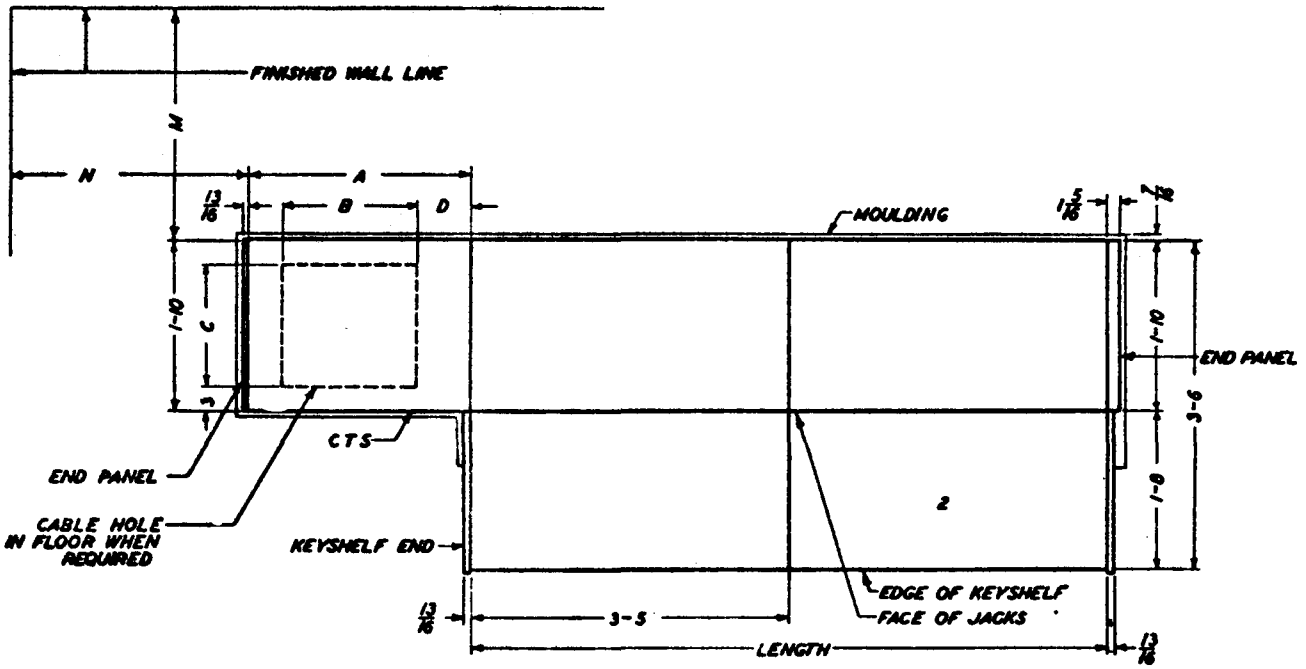
   (a) Measured Busy Hour Current Drain of a typical 4 position 24V Local Test Desk
   5 amperes at 24V.

   (b) Cost of converting pos per J95002F to J95002H (Labor and Material) $2400.00 (Estimated)
   Cost of a comparable new position J95002H 2300.00 (Estimated)

ISSUE	6			
DATE	2-51			



FLOOR PLAN CONVENTION
FIG 1



FLOOR PLAN DETAILS
FIG 2

WEIGHT AND VARIABLE DIMENSIONS					
	WEIGHT	A	B	C	D
CTS LARGE CAP	85	2-4 11/16	1-6	1-4	7
CTS SMALL CAP	75	1-2 11/16	6	1-1	4 1/2
SECT	675				

OVERALL LENGTH OF LINE	
SECTIONS IN LINE	LENGTH
2	6-10
3	10-3
4	13-8
5	17-1
6	20-6
7	23-11
8	27-4

NOTES
1 DIMENSION "M" IS COMMONLY MADE 2-6 UNLESS PILASTERS OR OTHER PROJECTIONS RESTRICT THE AISLE TO A WIDTH OF LESS THAN 1-6. DIMENSION "N" IS COMMONLY MADE 2-6 AND SHOULD NOT BE LESS THAN 1-8.
2 DIRECTION OF GROWTH MAY BE EITHER RIGHT OR LEFT BEGINNING AT THE CABLE TURNING SECTION.

FRAMEWORK

1. Section Framework and Assembly

Local Test Desk No. 14 is made up of single position sections. The section assembly is shown on ED-90235-12 and consists of an iron framework ED-90236-30 with wood trim and front and rear lift-out door panels.

Dimensions

Height	- 4' - 8"
Length	- 3' - 5"
Depth (front of keyshelf to back of desk)	- 3' - 6"
Height of keyshelf from floor	- 3' - 0"
No. of jack panels	- 4 on 10¼" centers
Width of jack panel opening	- 9 3/16"
Height of jack panel opening	- 15"

2. Cable Truning Section

A cable turning section (CTS) is provided at the head end of the lineup to accommodate the entrance cables. It is of wood construction, consisting of a front panel, top, and a rear "lift-out" door. The cable turning section is universal and may be placed at either end of the lineup. When the cables enter the top, a cable hole is cut in the top by the installer.

Two sizes of cable turning section are available.

The small capacity CTS shown on ED-90493-30 is used where The ulitmate number of positions in the lineup is eight or less.

The large capacity CTS shown on ED-90227-30 is generally used where the ultimate number of positions exceeds eight.

Dimensions	ED-90493-30	ED-90227-30
Height	4'-8"	4'-8"
Depth	1'-10"	1'-10"
Length	1'-2"	2'-4"

3. End Panel

The end panel (ED-90226-30) is constructed of wood and is universal: That is it may be mounted at either end of the line-up either on the CTS or the last position.

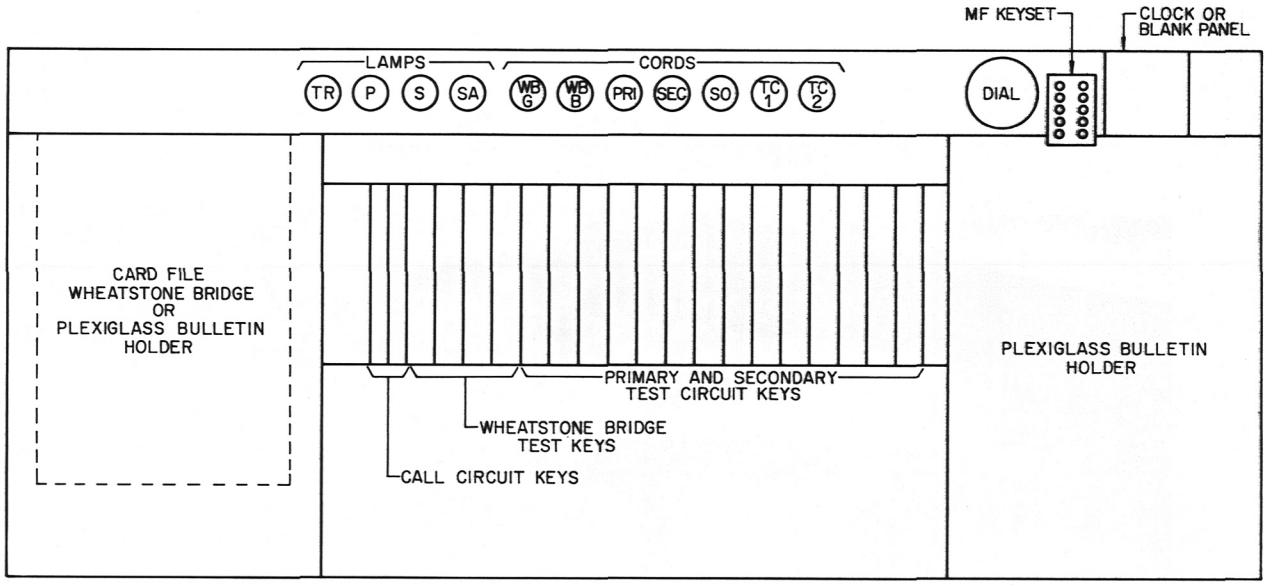
4. Angle Section

A 45° angle section (ED-90295-30) is available for use where the lineup makes a turn. It is of wood construction and is supported by the adjacent positions. It is assembled on the job.

5. Keyshelf

The keyshelf, shown on assembly drawing ED-90600-70, consists of a plug shelf at the rear and three sections, in the front. The left and right sections are covered with plexi-glass and serve as bulletin holder, and writing space. In a Wheatstone Bridge position, the Wheatstone Bridge is located in the left hand section instead of the bulletin holder. In other positions, a card compartment may be mounted in this location on an optional basis. A metal drawer, large enough to accommodate standard 8 1/2" x 11" writing pad, is provided in the lock rail under the right hand section.

The middle section is hinged to the plug shelf and contains a cutout for eighteen (18) "A" type test circuit keys and two strips of call circuit keys. The plug shelf is arranged to accommodate the test cords, lamps dial, MF keyset and electric clock.

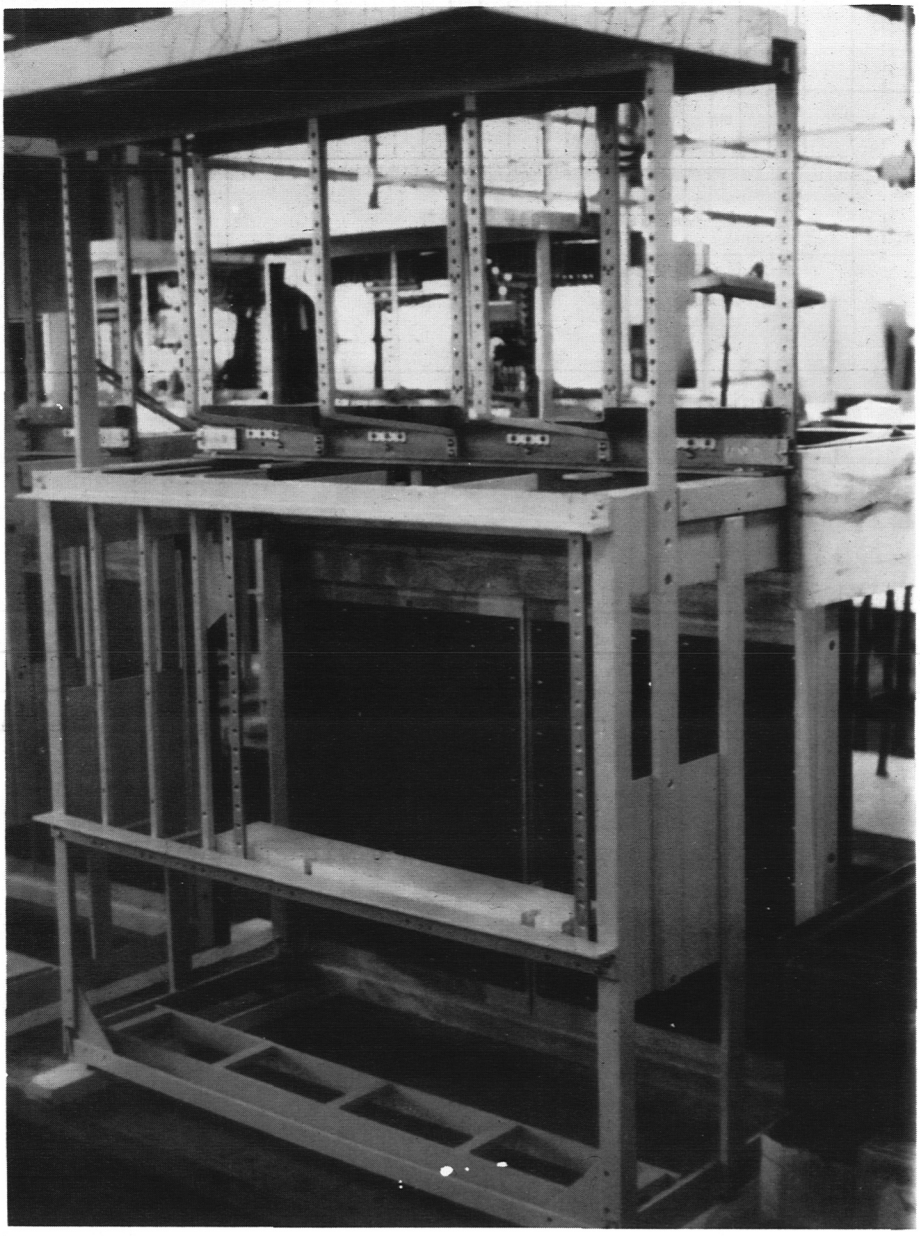


KEYSHELF AND PLUGSHELF EQUIPMENT

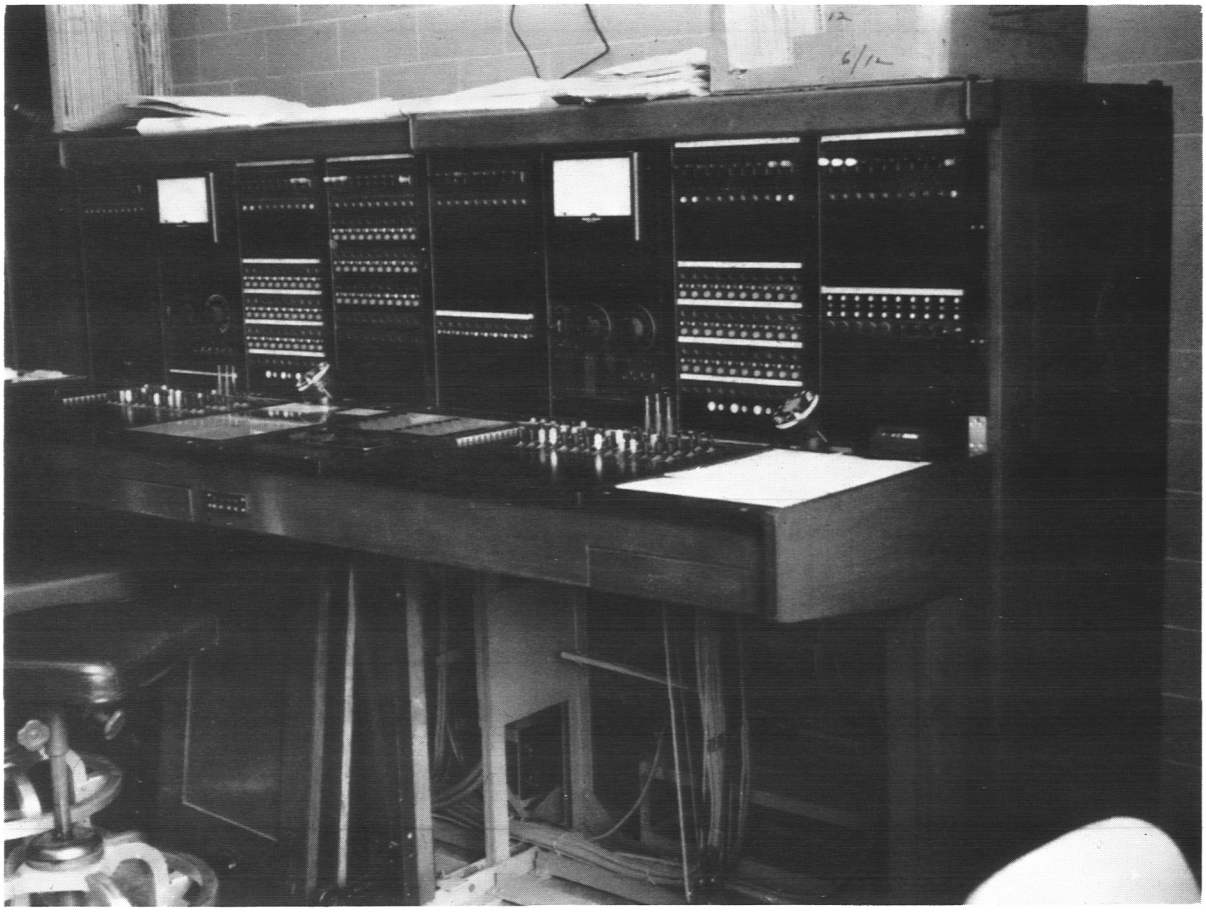
6. Finish

The standard finish for all exposed wood work of the Local Test Desk is medium mahogany on birch wood, No. 104AS finish. Other finishes such as walnut, etc. may be provided but require special editing.

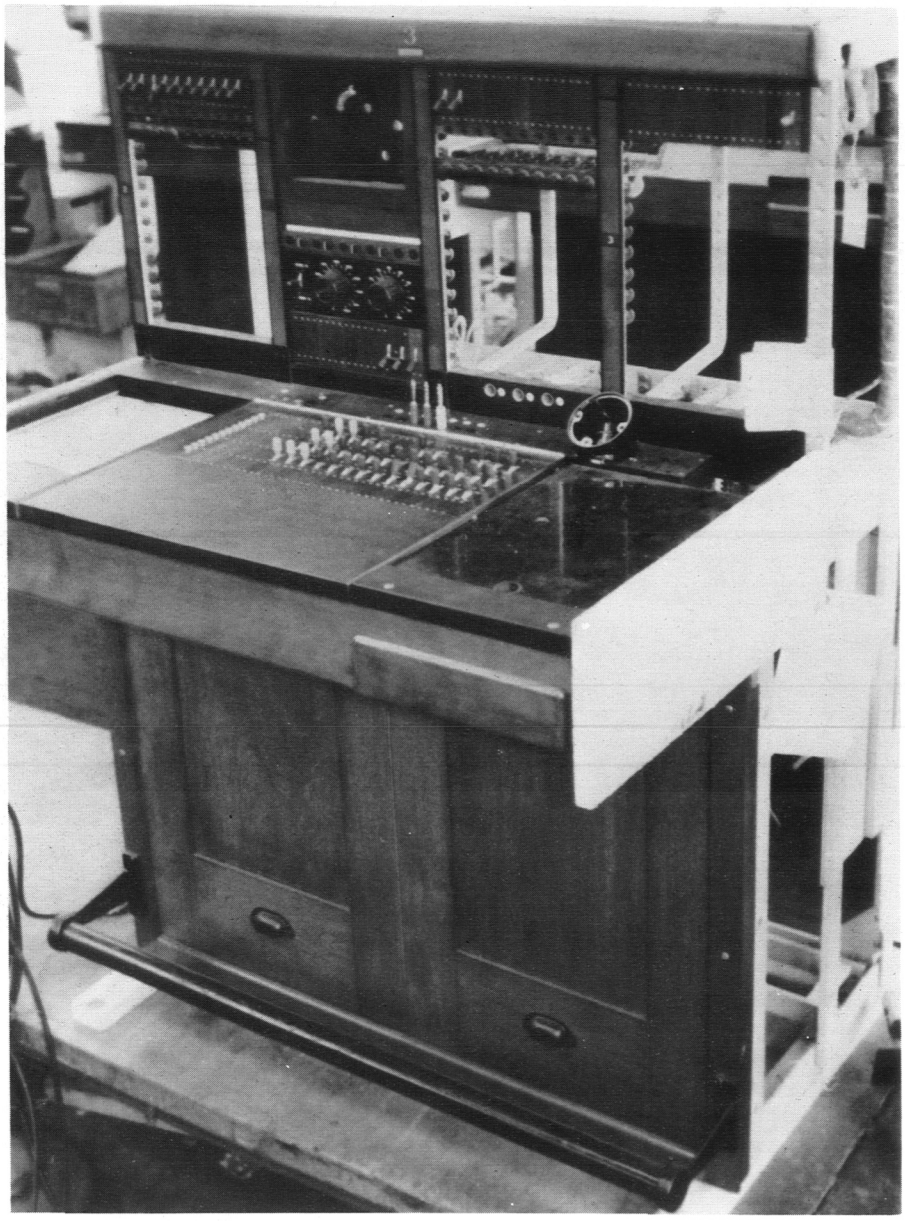
The keyshelf and face equipment are faced with phoenol fibre having a dull black 116E finish.



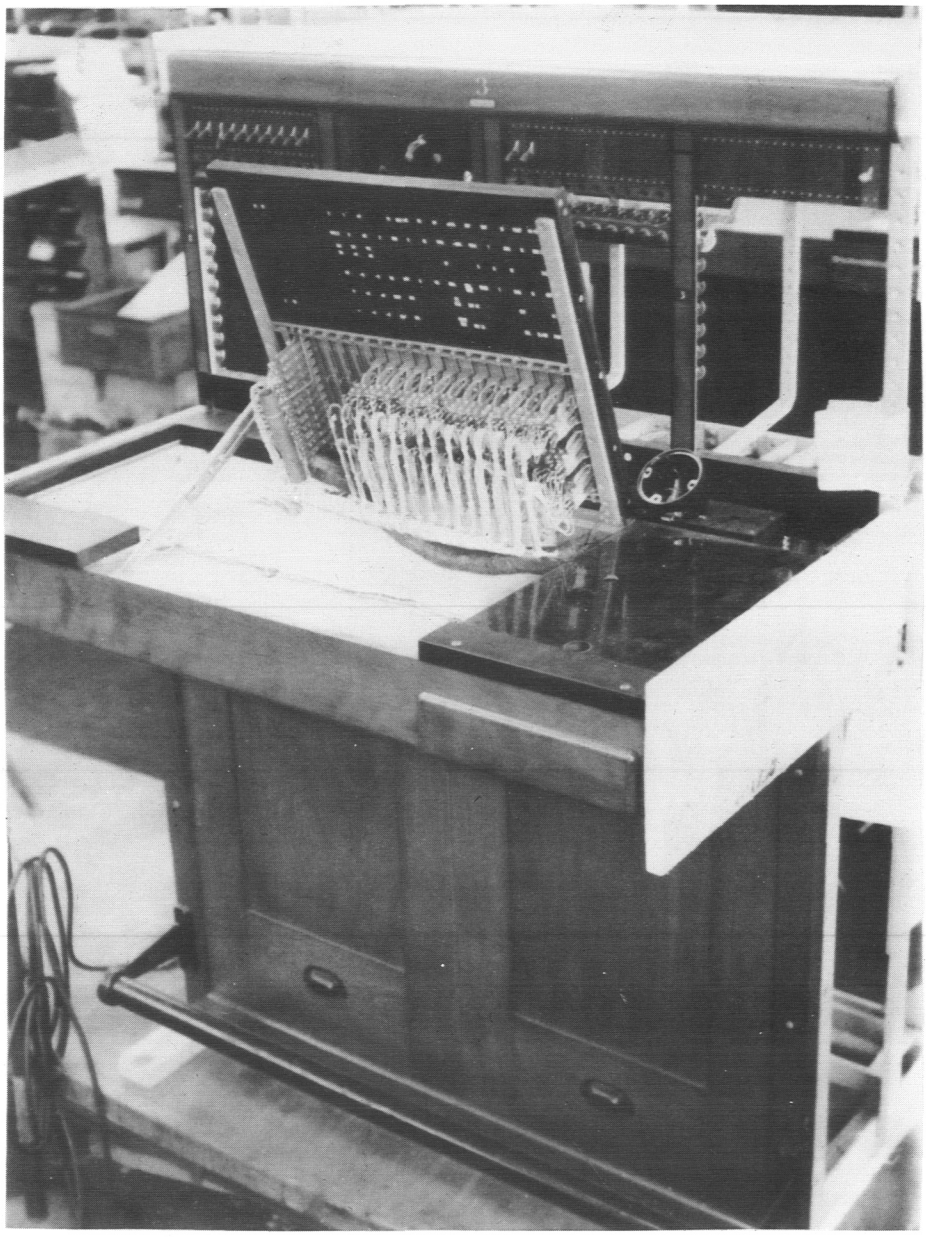
Section Assembly



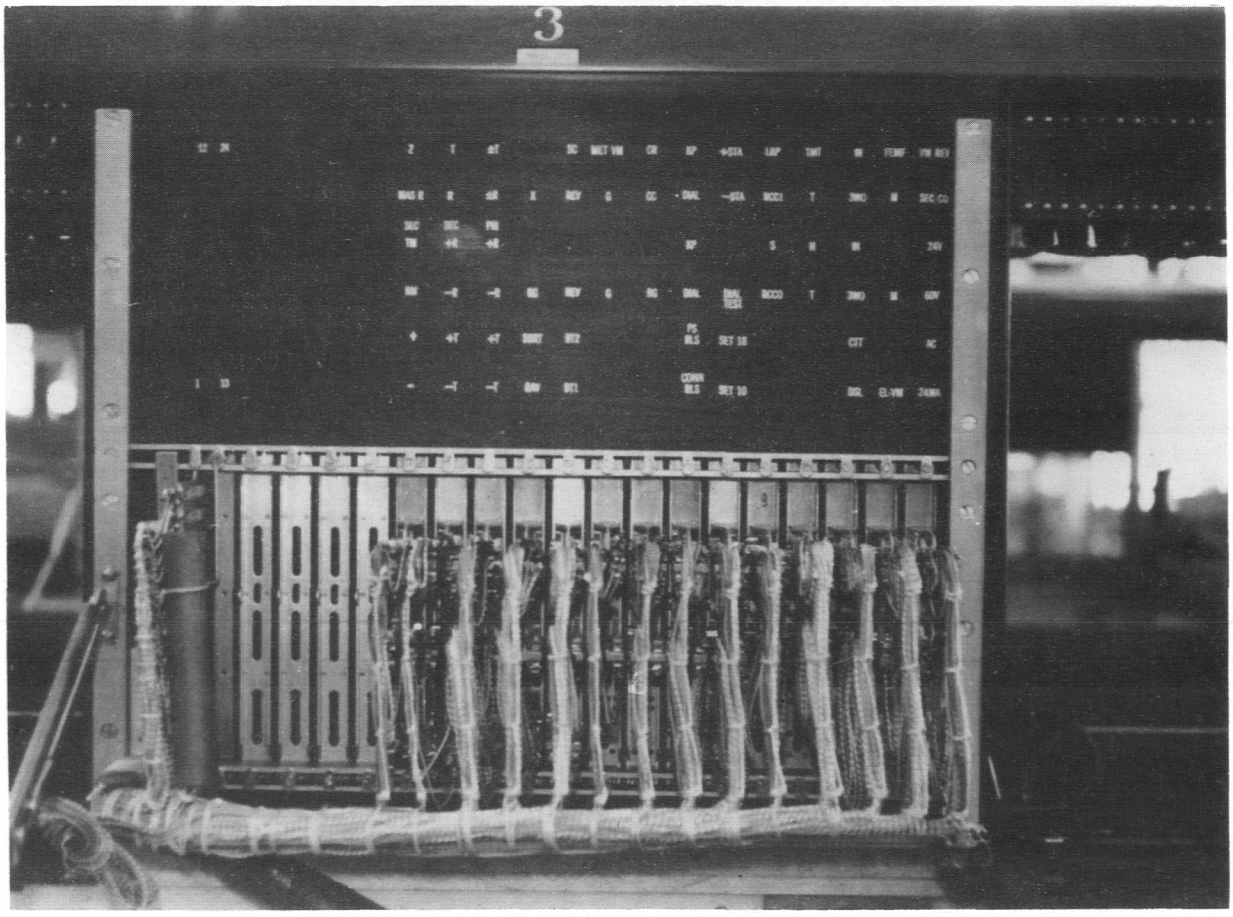
No. 14 Local Test Desk Showing Front Panels Removed



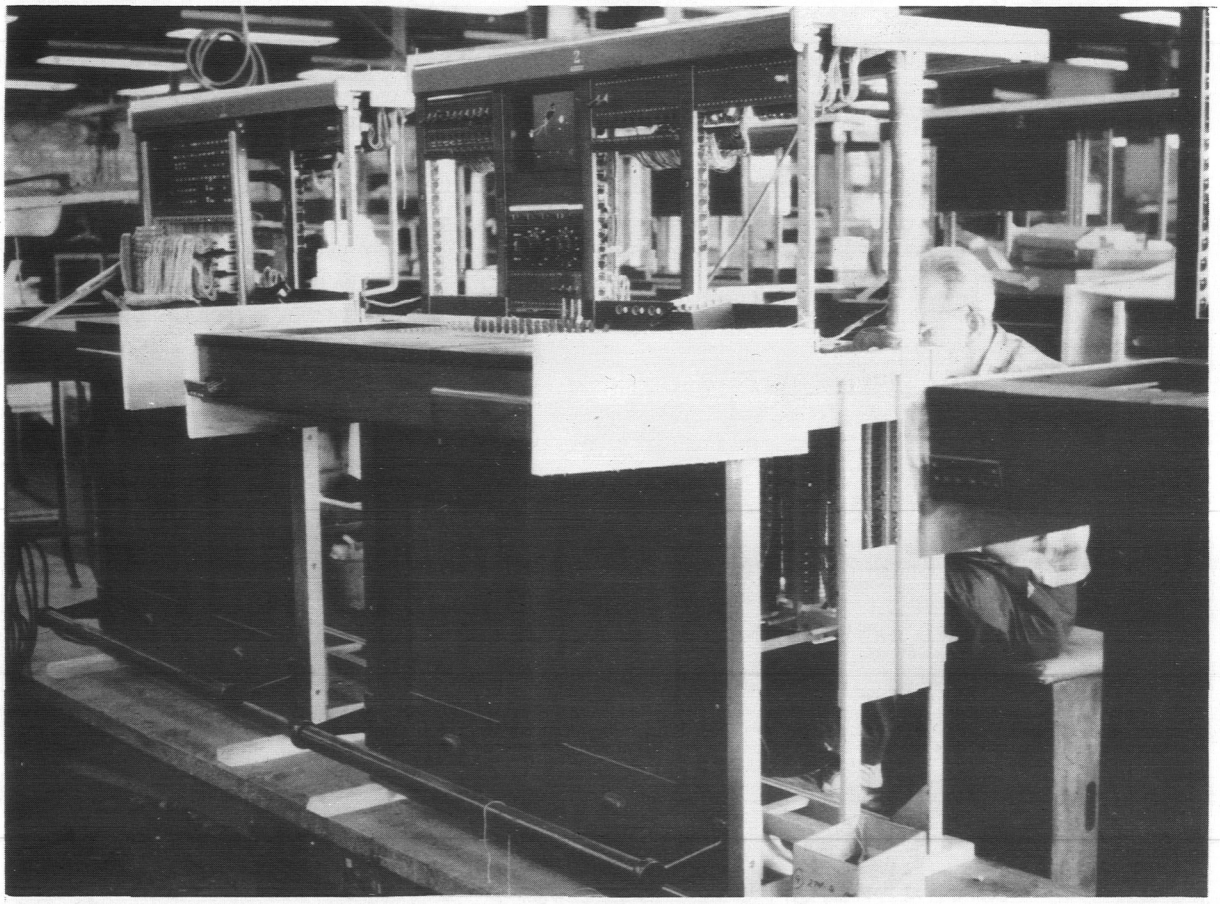
Position in Process of Manufacture



Position Showing Keyshelf Open to First Notch



Keyshelf Fully Open Showing Stamping
of Key Functions on Under Side



Position Being Wired in the Shop

C. EQUIPMENT

1. Position Equipment

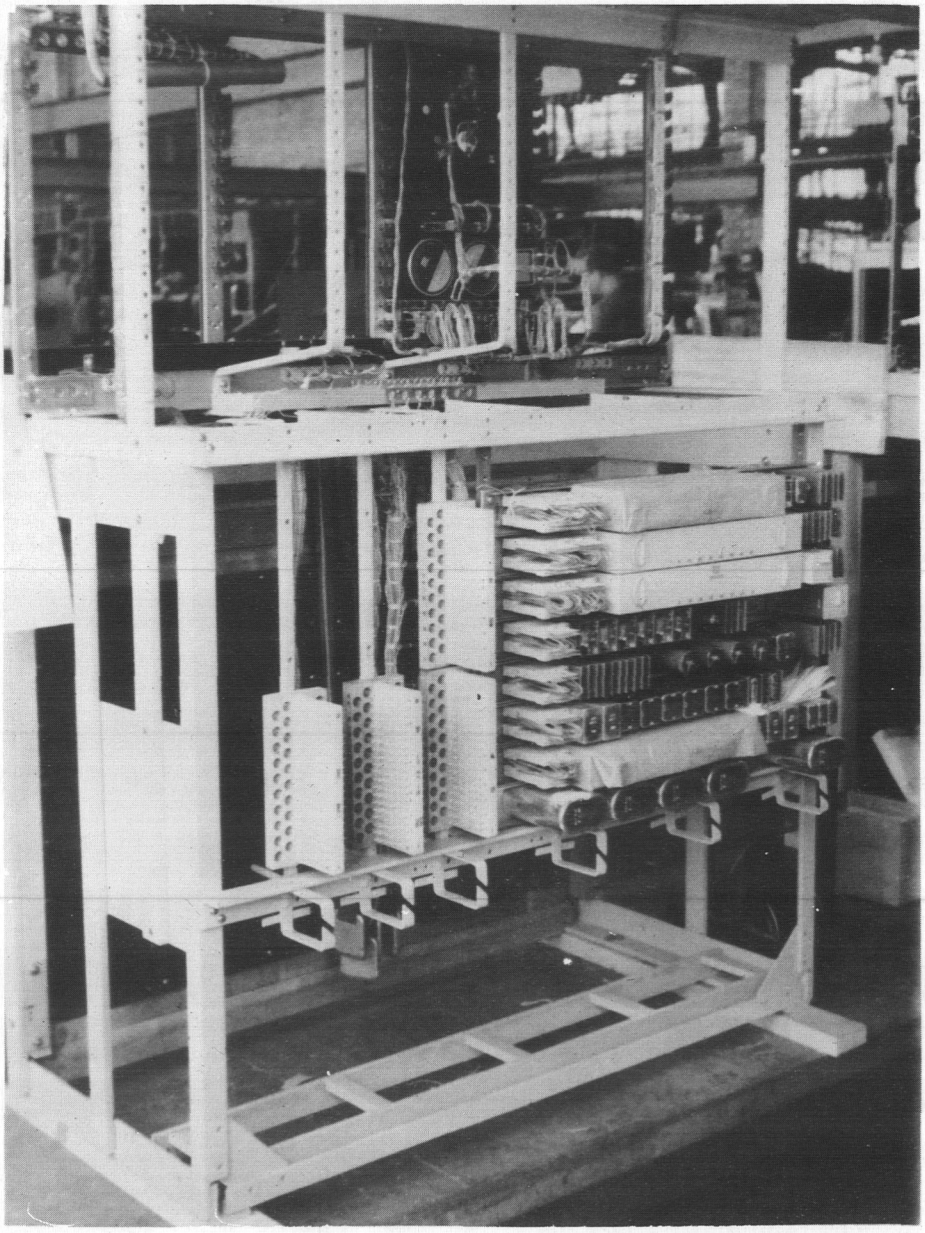
The basic position equipment is ordered in the position specifications J95002A, B, F or H and is wired and equipped in the shop. A position local cable interconnects the meter panel, keyshelf and rear equipment and terminates on six N4A or N6A terminal strips mounted on the rear framework for connection to the switchboard cabling.

1.1 Rear Equipment

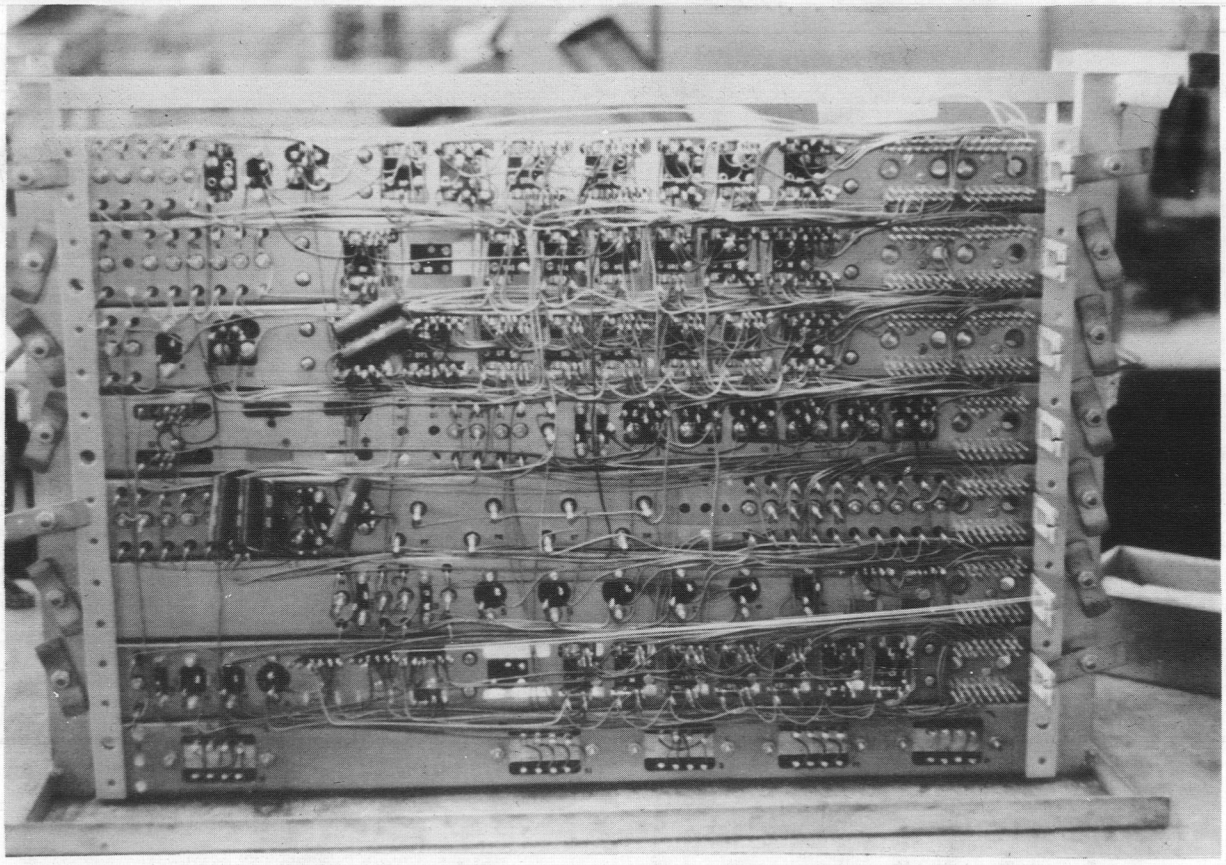
The rear equipments of positions made per J95002A, B and F consist of mounting plates of apparatus mounted directly on the section framework and wired directly to the local cable. The rear equipments of positions made per J95002H consist of two surface wired units. The position unit J95002J, always provided, contains the realy equipment for the basic desk circuits and consists of eight 23 inch mounting plates of equipment surface wired to 224 type terminal strips.

The other unit J95002K is furnished in the Wheatstone Bridge positions only and consists of one 23 inch mounting plate of equipment surface wired to a 224A terminal strip.

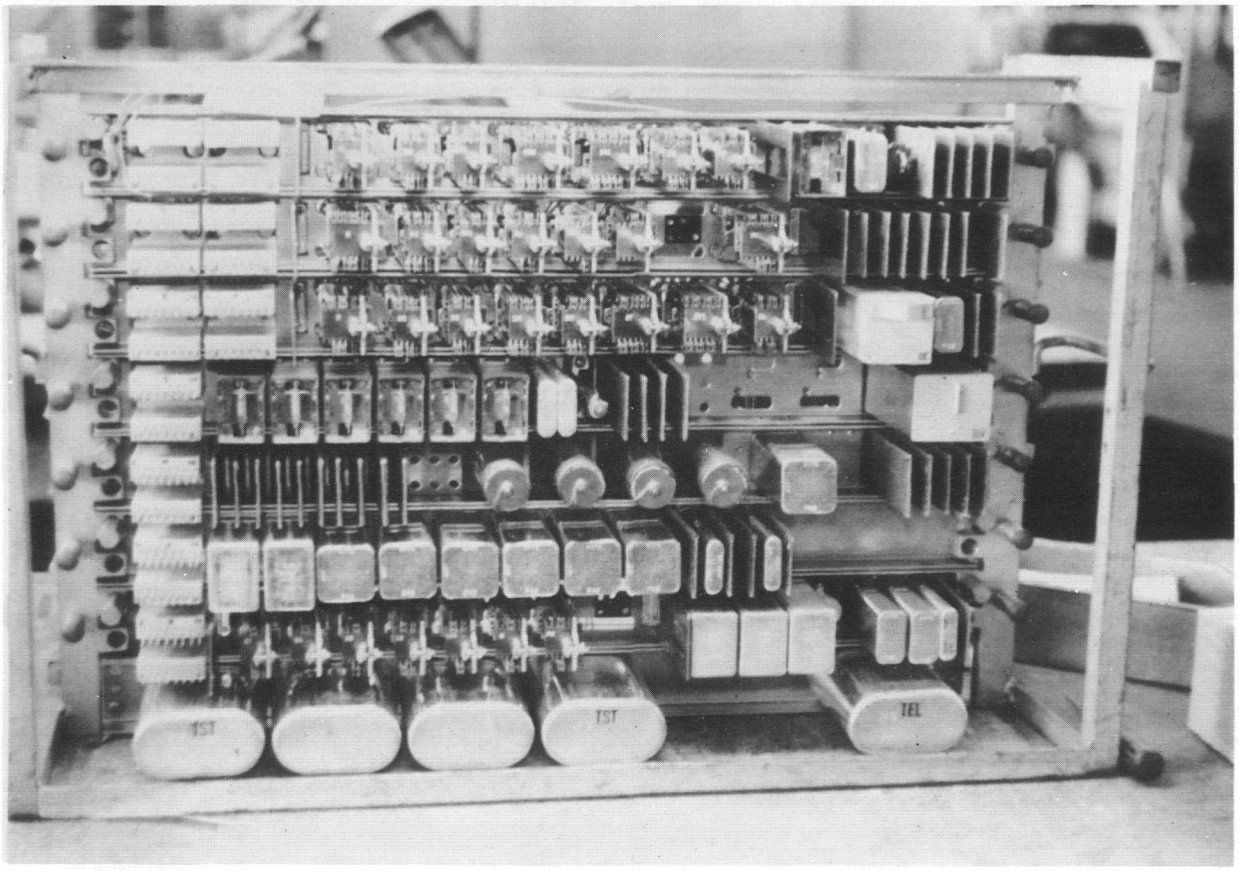
These units are mounted in the position and are connected to the position local cable by the shop.



View of Position Showing Rear Equipment



Rear Equipment Unit - Rear View



Rear Equipment Unit - Front View

1.2 Front Equipment

The front equipment of each position is divided into four 10 1/4 inch panels. The first, third and fourth panels reading from left to right, contain optional talking trunk keys and lamps, and test trunk jacks, lamps and keys. The voltmilliammeter, rheostat and miscellaneous equipment associated with the test cord circuit are located in the second panel from the left, regardless of the direction of growth. The test trunk jack equipment is provided in fully equipped strips of ten circuits. The typical front equipment arrangement for the regular test positions with or without a Wheatstone Bridge is shown on ED90208-10.

The following front equipment is wired in the local cable:

Talking keys and lamps - Panel 1, 3 & 4

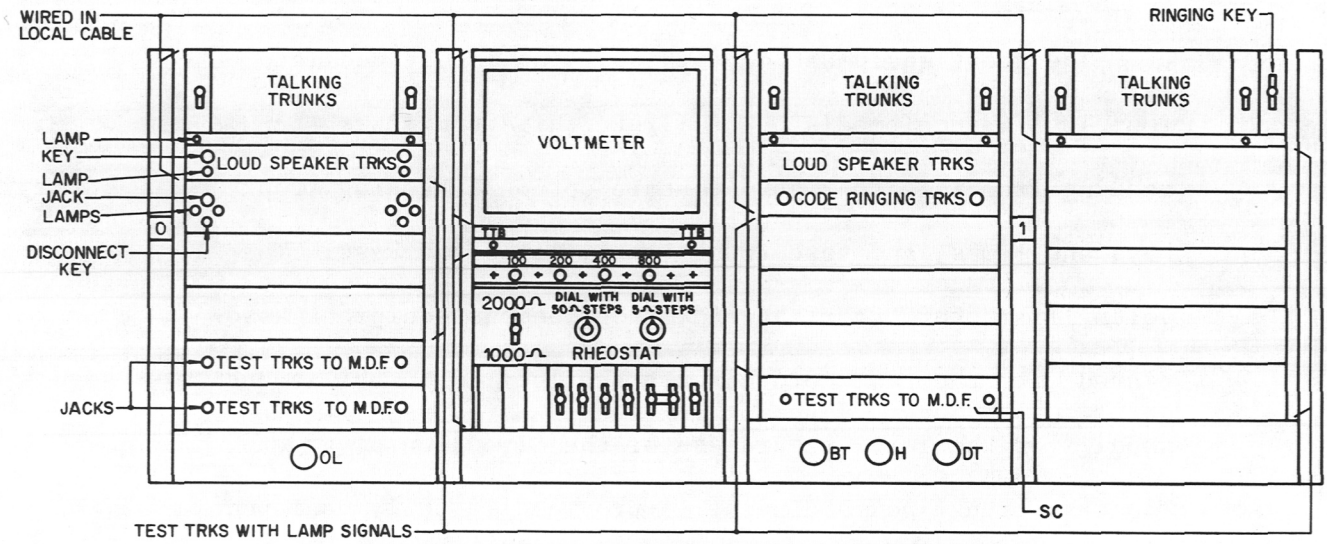
Loud speaker keys and lamps - Panel 1 & 3

Code ringing lines - Panel 3

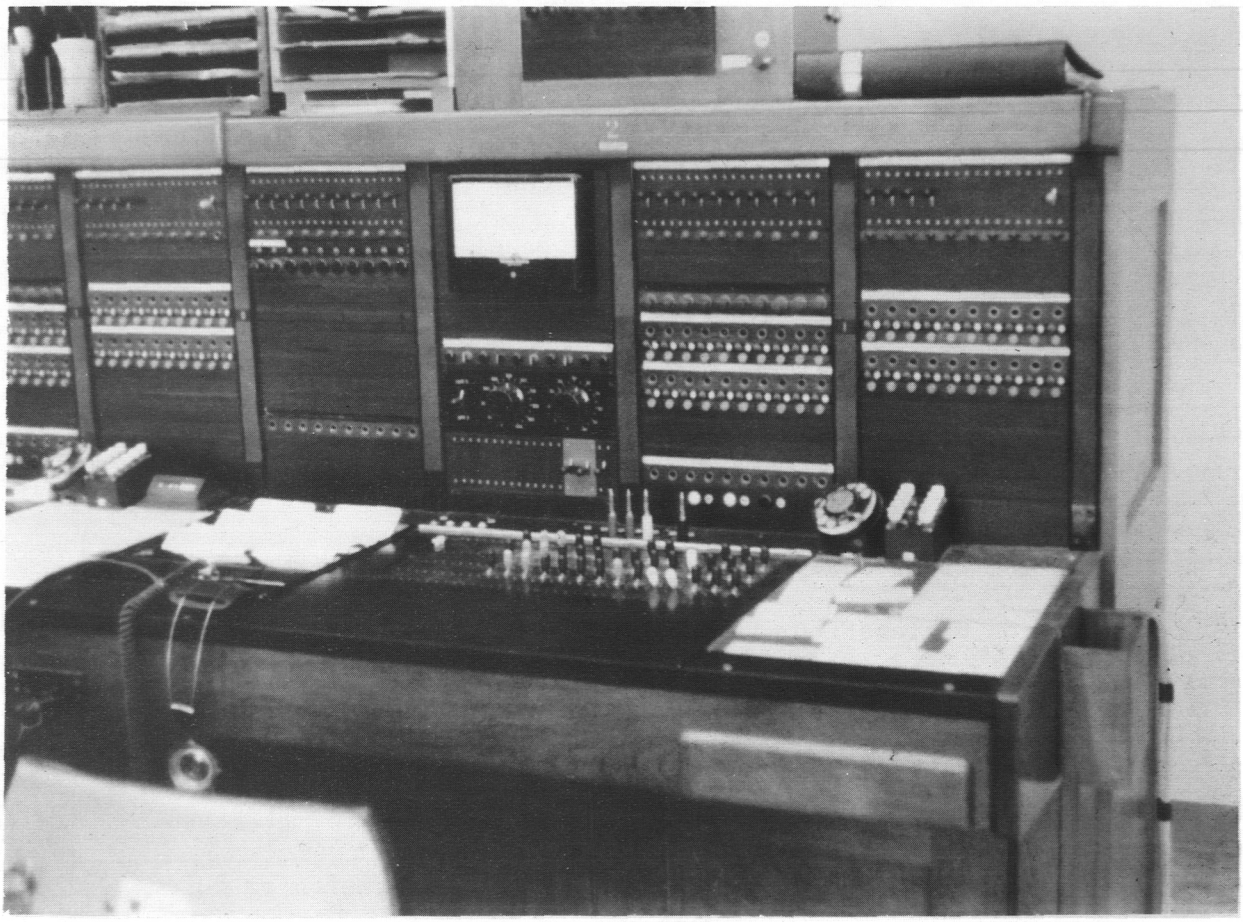
All equipment in Panel 2 except transfer and auxiliary keys and Touch-Tone busy lamps.

All other equipment is placed by the installer and will vary to meet job conditions.

The front equipment of the supervisory and light load position differs from that of the test position in that the talking trunks appear on jacks and lamps instead of keys and lamps in order to accommodate more circuits. All of the circuits of the lineup are multipled into this position to make them accessible to the supervisor under normal operation or to one man during periods of light load. Typical light load position front equipment is shown on ED90231-10.



TYPICAL FRONT EQUIPMENT



2. NUMBERING

2.1 Position Numbers

A decalcomania position number is placed in the center of the crown moulding of each new position by the shop. When positions are re-used or re-located in the field, 7/8 inch decalcomania numbers should be ordered for each renumbered position. (See EHB Sect. 3 for Piecepart Numbers of 7/8" decals.)

2.2 Mult. Numbers

140B Number plates are provided in the stile casing for the 1st and 4th panels of each position to indicate the equipment which is normally multipled on cable pins to like numbered panels. In large lineups this equipment is multipled on a 8 panel basis (2 positions) and number plates are provided as follows:

EIGHT PANEL MULT

140B No. Plt Nbd	Panel of Lineup	Position	Panel of Pos.
0	1, 9, 17, etc.	1, 3, 5, etc.	1
1	4, 12, 20, etc.	1, 3, 5, etc.	4
2	5, 13, 21, etc.	2, 4, 6, etc.	1
3	8, 16, 24, etc.	2, 4, 6, etc.	4

In small lineups this multiple is provided on a 4 panel basis (1 pos) and number plates are provided as follows:

FOUR PANEL MULT

140B No. Plt Nbd	Panel of Lineup	Position	Panel of Pos.
0	1, 5, 9, etc.	1, 2, 3, etc.	1
1	4, 8, 12, etc.	1, 2, 3, etc.	4

Panel 2 contains the meter and test cord circuit equipment and panel 3 contains test trunk equipment which is normally cabled individually to the distributing frame. No. 140G (Blank) number plates are provided for these panels in all cases.

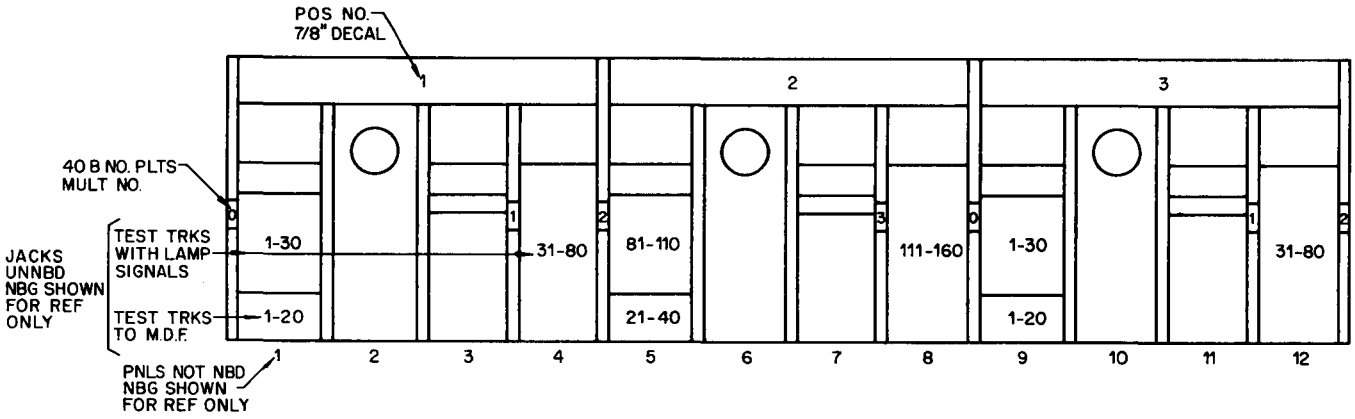
The 140 type number plates are ordered in lists on the position J specification drawing.

2.3 Panel Numbers

No number plates are provided in the piling rail to indicate panel numbers. Arbitrary consecutive left to right or right to left panel numbering depending upon the direction of growth is shown on the wiring list for reference only.

2.4 Jack Numbering

Test and talking trunk jack lamps and keys in the face equipment are furnished unnumbered. Designation strips are provided to indicate the trunk assignment. (For typical front equipment see ED90208-01 and ED90231-01. Arbitrary circuit numbering is shown on the office wiring list.



TYPICAL NUMBERING

2.5 Number Plates for Tagging MDF Cords

In order to identify the corresponding ends of cords used to connect the test trunk circuits from the jack boxes at the MDF to the protectors of the line under test, 145 type number plates are attached to each end of the cord in the field. These number plates are numbered consecutively from 1 up for each type of cord as follows, regardless of the circuit numbering:

Code of Nbr Plt	Designation Incl in Code	Nbr per Order
145F	T L (Test Line)	(1) Up
145D	P U (Plug Up)	(1) Up
145E	Blank	Nbrd by Installer as req'd Example:(CIT) (For Conductor Identification Tone)

For typical numbering of these plates see ED-90048-12.

D. CABLING

1. Local Cables - The position wiring is provided by the shop in three local cables. The basic local cable, always furnished, contains wiring for the test circuit, telephone circuit, ringing circuits, and clock circuit, and, in general, connects the keyshelf and meter panel with the rear equipment and terminal strips at the rear of the position. The second local cable, always furnished, maybe one of two types; one for a regular test position containing wiring for code ringing lines, talking keys and lamps and loud speaker trunks or the other for a supervisory and light load position containing wiring for loud speaker trunks only. The third local cable contains the Wheatstone bridge circuit wiring and is provided in addition to the above only in the Wheatstone bridge position.

2. Switchboard Cabling

The switchboard cables enter the test desk through the top or bottom of the CTS. The position cables connect to the 6 block type terminal strips and the unit terminal strips in the rear of the position. The call circuit cables connect to the first position and are multipled to other positions at the position terminal strips. Talking trunk key and lamp circuits may be multipled at the position terminal strips or cabled individually from each position to the distributing frame where they may be multipled and cross connected to the relay equipment as required.

The test trunk equipment in the third panel is generally cabled individually down through the running box to the distributing frame. The test trunks in the 1st and 4th panel are generally cabled to the first appearance and multipled through the lineup on cable pins on an 8 panel basis in large lineups or on a 4 panel basis in small lineups. However, the above may be varied according to job requirements.

2.1 Shop Formed Switchboard Cable

The jack field equipment of certain test trunk circuits is generally connected to formed switchboard cable in the shop and shipped with the cable when the cable runs do not exceed convenient shipping lengths.

Shop forming information is shown on the following drawings:

Drawing	Equipment	Circuit
H-554-151	Jacks	SD95737-01
H-554-152	Lamps & Keys	SD95737-01
H-554-198	Jacks	SD90056-01

2.2 Type of Cable

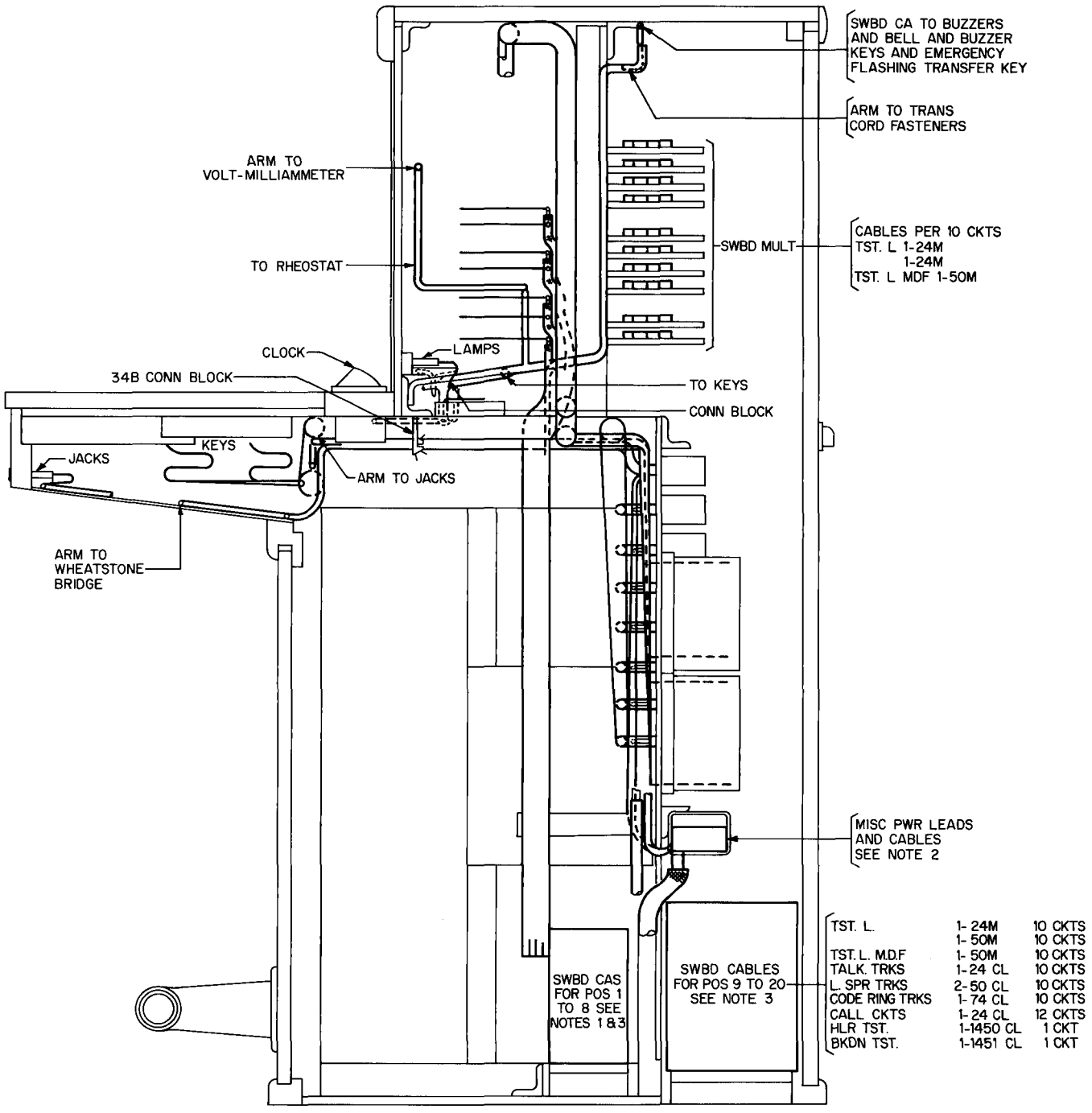
Superior insulation is required for the test paths between the test desk and the service cabling. Prior to 1962, 1000 type cable (enameled wire) was a requirement for this cabling. In the second quarter of 1962, 1000 type cable was superseded by "M" type cable (22 PVC CL) for this purpose.

Ref: BSP Sect. AA 610.003.

3. Cable Racks in Desk

Two cable racks are provided on the floor inside the desk. One is a 5 inch cable rack which runs inside the vertical uprights and forms part of the iron framework of the position. The other is a 7 inch independent cable rack fastened to the floor outside of the iron framework between the iron frame and the rear door. This rack together with clamps and anchor bolts is ordered separately in 9'-8 1/2" lengths as indicated on the iron framework assembly drawing ED-90236-30 and cut by the installer.

The switchboard cables which serve the first eight positions are run on the 5 inch cable rack inside the rear vertical upright. In lineups of eight positions or less the battery trays may be located on the 7 inch cable rack outside of the vertical upright. In larger lineups, the cables serving positions 9 to 20 are run on the 7 inch cable rack in which case the batteries cannot be mounted in the section and must be located on the relay rack or in a battery cabinet. The cabling plan for the local test desk is shown on ED-92866-01.

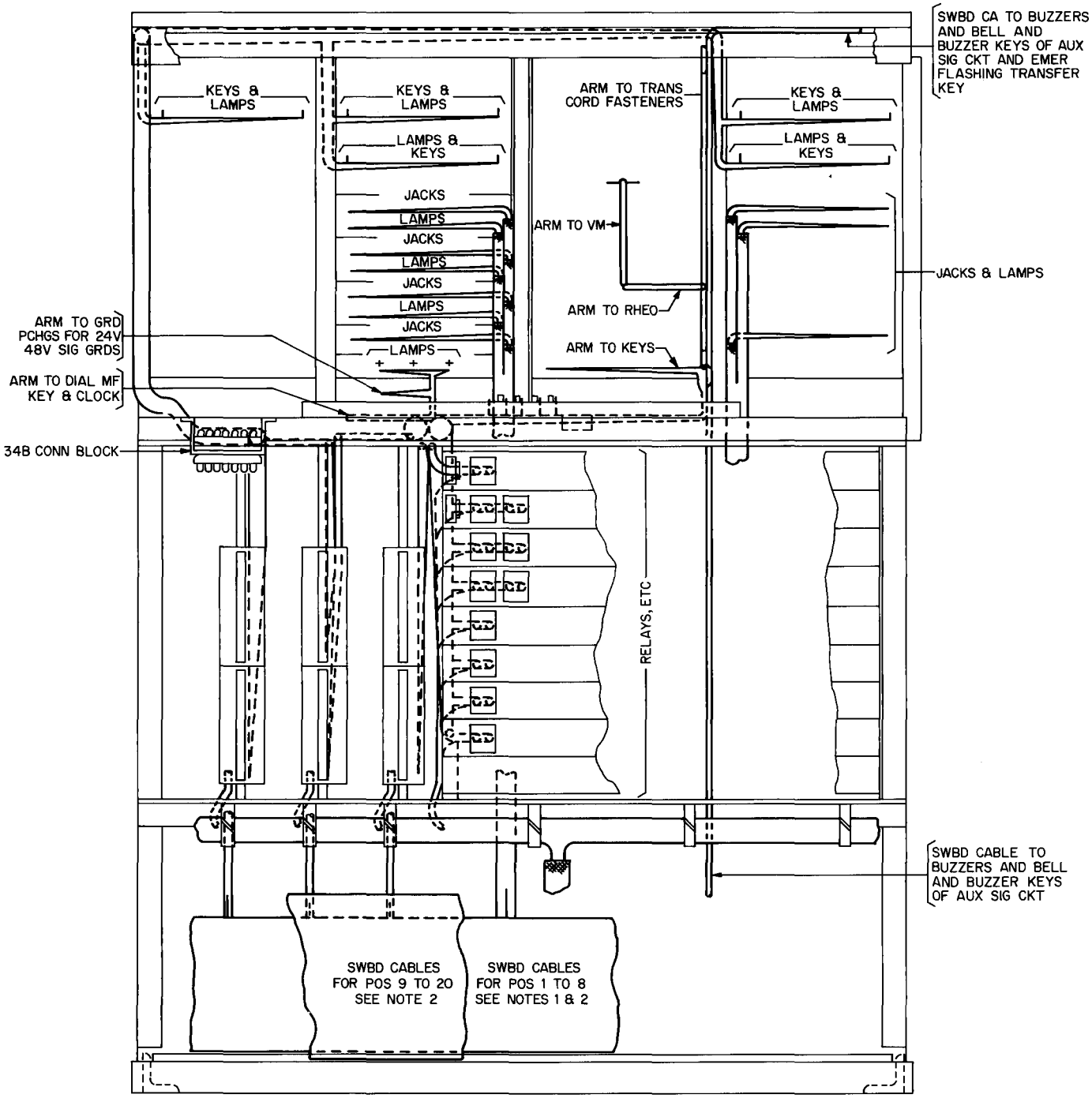

SWBD CA TO BUZZERS AND BELL AND BUZZER KEYS AND EMERGENCY FLASHING TRANSFER KEY
ARM TO TRANS CORD FASTENERS
ARM TO VOLT-MILLIAMMETER
TO RHEOSTAT
SWBD MULT
CABLES PER 10 CKTS
TST. L 1-24M
1-24M
TST. L MDF 1-50M
CLOCK
LAMPS
34B CONN BLOCK
TO KEYS
CONN BLOCK
KEYS
JACKS
ARM TO JACKS
ARM TO WHEATSTONE BRIDGE
MISC PWR LEADS AND CABLES SEE NOTE 2
SWBD CAS FOR POS 1 TO 8 SEE NOTES 1 & 3
SWBD CABLES FOR POS 9 TO 20 SEE NOTE 3
TST. L. 1-24M 10 CKTS
1-50M 10 CKTS
TST. L. M.D.F 1-50M 10 CKTS
TALK. TRKS 1-24 CL 10 CKTS
L. SPR TRKS 2-50 CL 10 CKTS
CODE RING TRKS 1-74 CL 10 CKTS
CALL CKTS 1-24 CL 12 CKTS
HLR TST. 1-1450 CL 1 CKT
BKDN TST. 1-1451 CL 1 CKT

PANEL AND ADJOINING IRONWORK REMOVED

END VIEW

NOTES:

1. USE THIS SPACE FOR THE FIRST 8 POSITIONS NEAREST THE POINT OF ENTRANCE OF THE CABLES, WHEN BATTERIES ARE LOCATED IN THE SECTION.
2. CABLES COMMON TO SEVERAL POSITIONS SHALL BE BUTTED MIDWAY BETWEEN THE POS WHICH THEY SERVE AND THE LEADS DISTRIBUTED IN BOTH DIRECTIONS WITH THE MISC PWR WIRES TO THE POS TERM. STRIPS. CABLES INDIVIDUAL TO A POS SHALL BE BUTTED BELOW THE TERM. STRIP AND FANNED IN THE USUAL MANNER.
3. CABLES FOR POS 9 TO 20 SHALL BE LOCATED AS SHOWN IN THE END VIEW WHEN AN INITIAL INSTALLATION OF 8 POS OR LESS HAS HAD BATTERIES LOCATED IN THE SECTION.


SWBD CA TO BUZZERS AND BELL AND BUZZER KEYS OF AUX SIG CKT AND EMER FLASHING TRANSFER KEY
KEYS & LAMPS
KEYS & LAMPS
ARM TO TRANS CORD FASTENERS
KEYS & LAMPS
LAMPS & KEYS
LAMPS & KEYS
JACKS
LAMPS
JACKS
LAMPS
JACKS
LAMPS
JACKS
LAMPS
ARM TO VM
ARM TO RHEO
ARM TO KEYS
JACKS & LAMPS
ARM TO GRD PCHGS FOR 24V 48V SIG GRDS
ARM TO DIAL MF KEY & CLOCK
34B CONN BLOCK
RELAYS, ETC
SWBD CABLE TO BUZZERS AND BELL AND BUZZER KEYS OF AUX SIG CKT
SWBD CABLES FOR POS 9 TO 20 SEE NOTE 2
SWBD CABLES FOR POS 1 TO 8 SEE NOTES 1 & 2

DOORS REMOVED

REAR VIEW

NOTES:

1. USE THIS SPACE FOR THE FIRST 8 POSITIONS NEAREST THE POINT OF ENTRANCE OF THE CABLES, WHEN BATTERIES ARE LOCATED IN THE SECTION.
2. CABLES FOR POS 9 TO 20 SHALL BE LOCATED AS SHOWN IN THE END VIEW WHEN AN INITIAL INSTALLATION OF 8 POS OR LESS HAS HAD BATTERIES LOCATED IN THE SECTION.

E. CIRCUIT FEATURES

1. General

The No. 14 Local Test Desk Circuits are located as follows:

1.1 Circuits Located in the Position

Primary and Secondary Test Ckt

Wheatstone Bridge Ckt (WB Pos only)

Telephone Circuit

Primary Ringing Ckt

Secondary Ringing Ckt

Auxiliary Signal Ckt (1 per lineup)

Position Clock Ckt (1 per 2 Pos)

1.2 Circuits Appearing in the Jack Field

Incoming or Outgoing Test Trunks

MDF Test Trunks

Intermittent Trouble Test Trks

Wheatstone Bridge Test Trks (WB Pos only)

Loud Speaker Trks

Talking Trunks - (Key ended or Jack ended)

Code Ringing Lines

Monitoring Jacks

1.3 Circuits Located on the Relay Rack

Howler Ckt or Receiver Off Hook Tone Ckt

Breakdown Test Ckt

Dial Tester Ckt

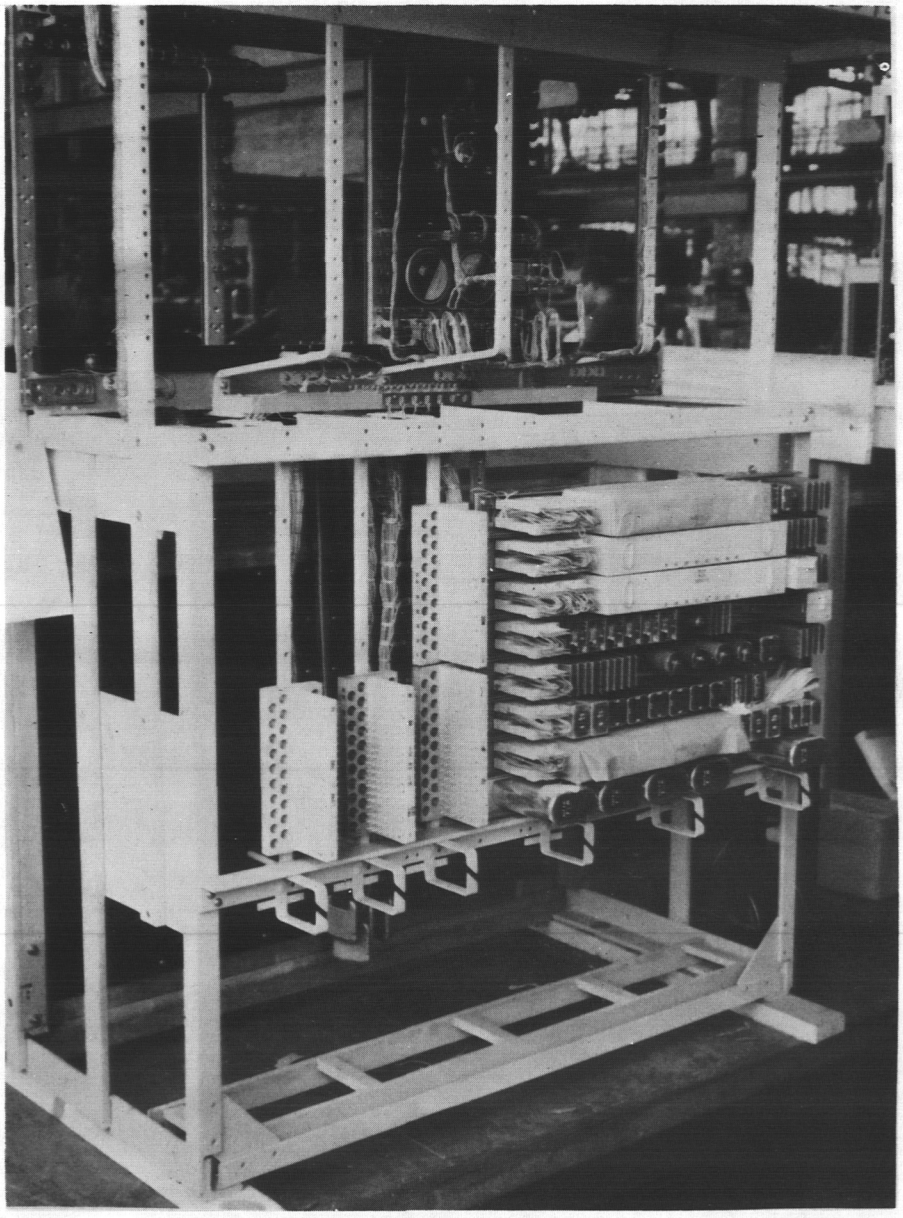
Electronic Voltmeter Ckt

Conductor Identification Tone Ckt

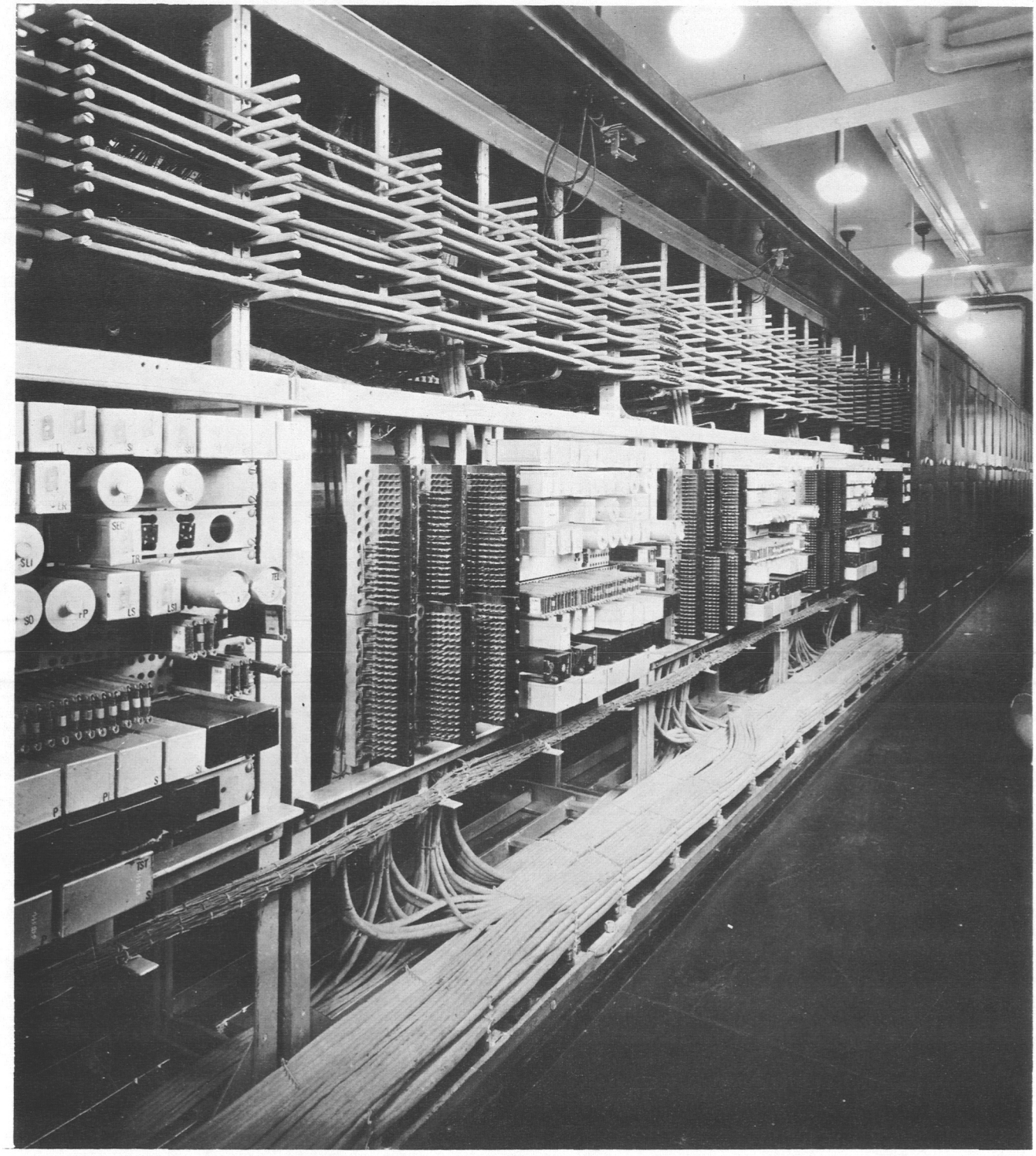
Aux Signal Relay Ckt (Common to Lineup)

Flashing Ckt (Common of Office)

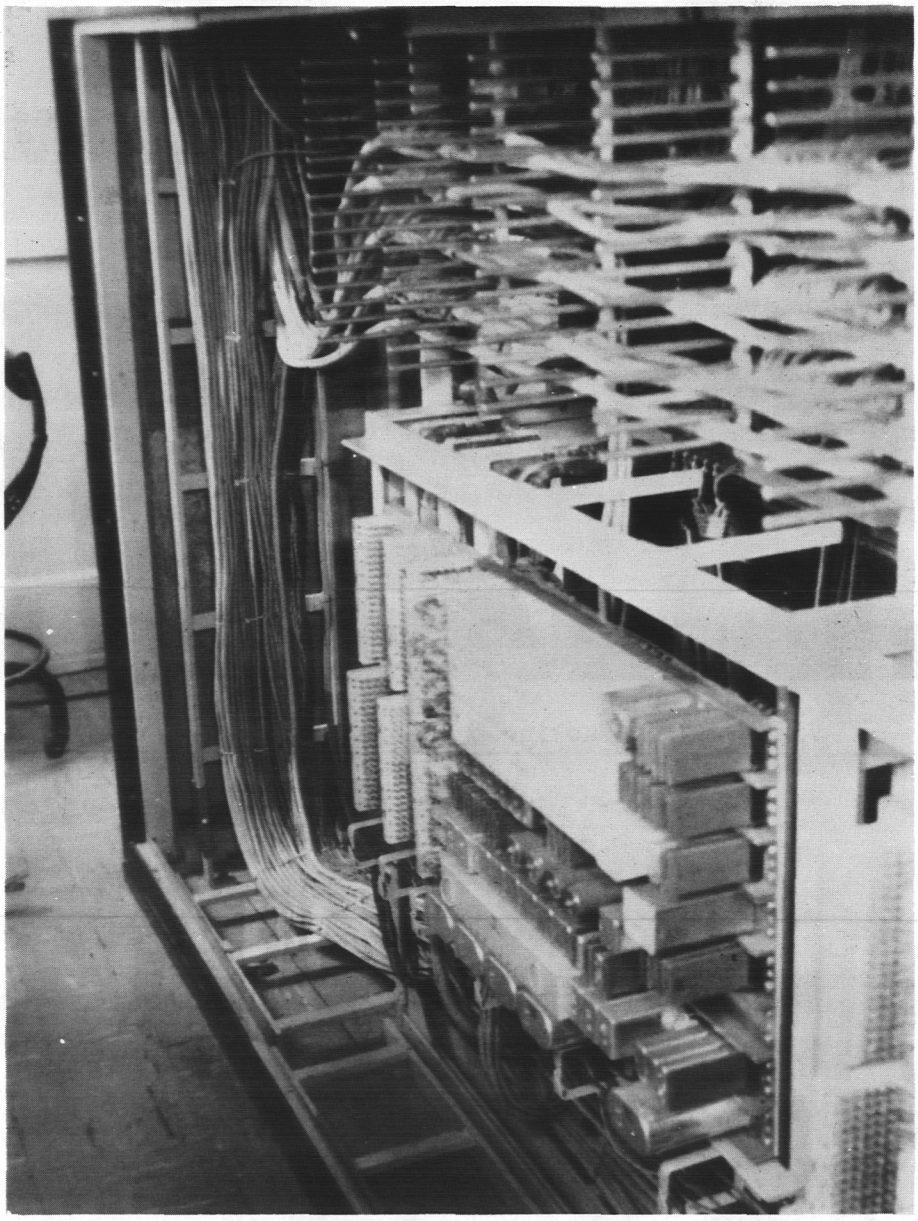
Relay Units Associated with the Position Ckts and Jack Field Ckts



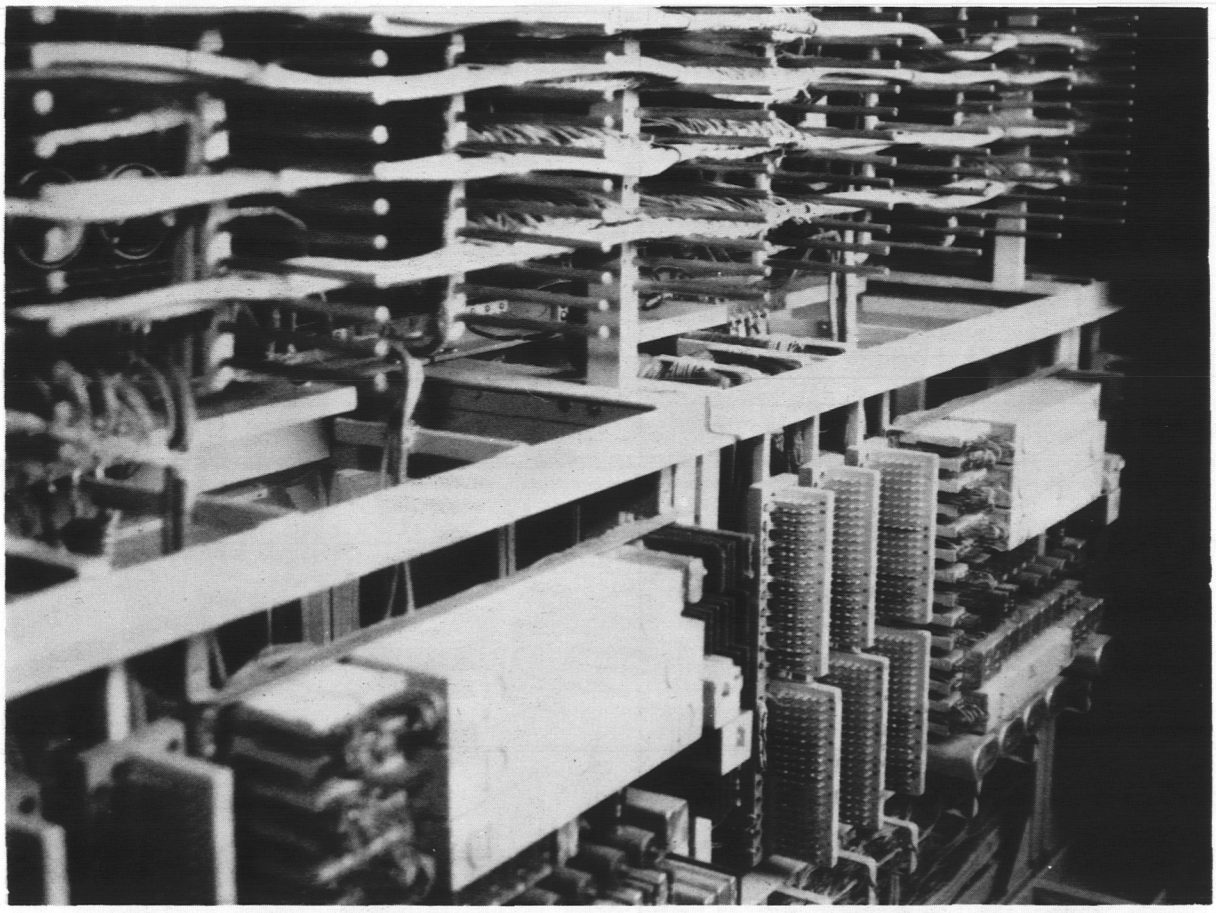
Partially Assembled Section Showing Local Cable



Initial Installation of LTD No. 14 Showing Cabling

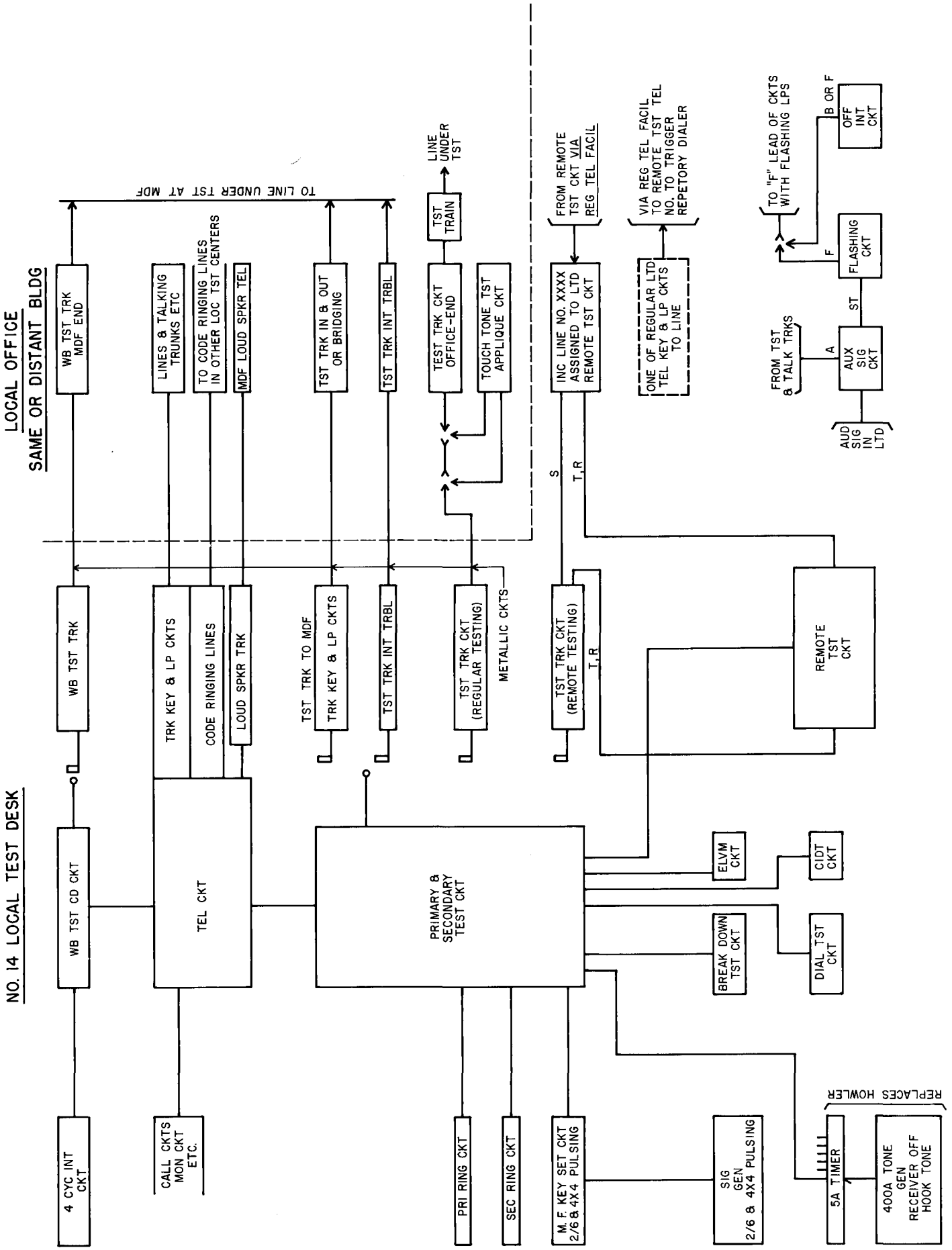


View Showing Cabling Entering CTS



View Showing Cabling on Cable Pins

Rear View Showing Cabling


NO. 14 LOCAL TEST DESK
LOCAL OFFICE
SAME OR DISTANT BLDG
TO LINE UNDER TST AT MDF
WB TST TRK MDF END
LINES & TALKING TRUNKS ETC
TO CODE RINGING LINES IN OTHER LOC TST CENTERS
MDF LOUD SPKR TEL
TST TRK IN & OUT OR BRIDGING
TST TRK INT TRBL
TST TRAIN
LINE UNDER TST
TEST TRK CKT OFFICE-END
TOUCH TONE TST APPLIQUE CKT
FROM REMOTE TST CKT VIA REG TEL FACIL
VIA REG TEL FACIL TO REMOTE TST TEL NO. TO TRIGGER REPETORY DIALER
TO "F" LEAD OF CKTS WITH FLASHING LPS
B OR F
OFF INT CKT
F
FLASHING CKT
ST
A
AUX SIG CKT
FROM TST & TALK TRKS
AUD SIG IN LTD
ONE OF REGULAR LTD TEL KEY & LP CKTS TO LINE
INC LINE NO. XXXX ASSIGNED TO LTD REMOTE TST CKT
S
T,R
WB TST TRK
TRK KEY & LP CKTS
CODE RINGING LINES
LOUD SPKR TRK
TST TRK TO MDF
TRK KEY & LP CKTS
TST TRK INT TRBL
TST TRK CKT (REGULAR TESTING)
METALLIC CKTS
TST TRK CKT (REMOTE TESTING)
T,R
REMOTE TST CKT
WB TST CD CKT
TEL CKT
PRIMARY & SECONDARY TEST CKT
ELVM CKT
CIDT CKT
BREAK DOWN TST CKT
DIAL TST CKT
4 CYC INT CKT
CALL CKTS MON CKT ETC.
PRI RING CKT
SEC RING CKT
M. F. KEY SET CKT 2/6 & 4X4 PULSING
SIG GEN 2/6 & 4X4 PULSING
REPLACES HOWLER
5A TIMER
400A TONE GEN RECEIVER OFF HOOK TONE

2. Primary and Secondary Test Circuit

2.1 Description

The Primary and Secondary Test Circuit is furnished in each position and provides the testing facilities. It is the basic circuit of the test desk.

The following is a complete list of Primary and Secondary Test Circuits used in Local Test Desk #14.

Circuit	Issued	Rating Date	Specification Dwgs	Replaced by
SD90053-01	1929	MD July 1931	J95002A-1 to -3,B-1 to -3	SD90497-01
SD90497-01	May 1931	MD Oct. 1956	J95002F-1 to -11,G-1 to-4	SD95612-01
SD95612-01	Sept 1955	Std. - - -	J95002H-1,H-2,J-1,J-2	- - - -

Characteristics

SD90053-01 and SD90497-01	SD95612-01
24V Relays	48V Relays
24V Lamps	24V and 48V Lamps
48V Transmission	48V Transmission
Require both 24V and 48V Supply	Will operate on 48V alone, or 24V and 48V Supply

The same testing features are available in all three circuits.

See table of compatibility Section II-A-5.

The Primary and Secondary Test Circuit is composed of three separate test cord circuits as follows:

2.101 The Primary Cord (PRI) associated with the primary test circuit is used for making tests where it is necessary to measure current or voltage such as tests for:

Resistance grounds

Bridged resistance

Continuity

Crosses with other lines

Ballistic Capacity Test

Coin prepay line relay test

Coin control test

Subset relay test

Tube type Subset test

Terminal hunting and party line

Identification test

2.102 The Secondary Cord (SEC) associated with the secondary test circuit is used for making tests which require more time such as:

Transmission Test

Line relay operating test

Insulation breakdown test

(Howler Test) Receiver Off-Hook Tone Test

Dial Test

2.103 The Sounder Cord (SO) associated with the secondary test circuit is used to locate cable pairs.

The sounder cord places tone on the ring and ground on the tip of the line to assist in identifying a cable pair. Battery through the winding of a relay which operates a sounder or buzzer is also placed in the ring of this cord to signal the test desk operator on closure of the cable pair.

2.104 Position Volt-Milliammeter

The volt-milliammeter is part of the basic test circuit and is located in the front equipment, always in the second panel from the left in each position regardless of the direction of growth. It is used in the primary and secondary test circuit as follows:

a. To indicate voltage, current or resistance.

b. In conjunction with the dial tester to indicate dial speed (read directly on the 24V scale).

c. In conjunction with the "voltmeter bridge test" as a galvanometer in a simple bridge circuit to provide a quick method of determining the circuit condition for setting up the Wheatstone bridge test.

d. In conjunction with the electronic voltmeter circuit to measure very high insulation resistance of lines.

e. To indicate stray AC potentials on subscriber lines.

There are three vintages of volt-milliammeters in use in the Local Test Desk.

KS-1366 round type Weston model 57 meter approximately 8 1/2" in diameter flush mounted (furnished in positions made from J95002A, B, G, F-1 to F-7 and early F-8). This meter is no longer manufactured.

KS-13724 round type Weston model 57 meter which is made from the KS-1366 meter by changing the 24V - 24MA terminal to a 1.2 MA terminal (furnished in positions made from late J95002F-8 and earlier positions which have been modified in the field). The 24-24MA reading on this meter is obtained by means of a 1053 ohm shunt resistor in the test cord circuit which is connected across the 24V-1.2MA winding when the (1000 ohm) or (24MA) key is operated.

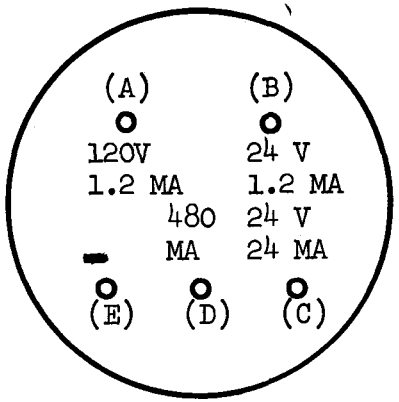
WECo. S9A rectangular meter which provides all of the scales of the above meters plus a 60V scale. This meter is furnished in positions made from J95002F-9 to F11 and J95002H.

The 1.2 MA scale is required for the following testing features:

1. Meter type dial test
2. Voltmeter bridge test in a Wheatstone bridge position
3. AC voltage, metallic and 60V scale feature with or without electronic voltmeter test.

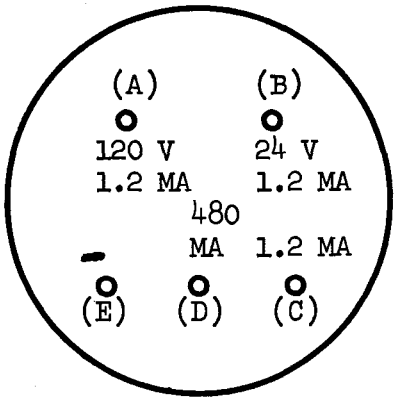
When any of these features is added in a position having a KS 1366 meter, the meter must be modified to a KS 13724 meter or replaced by the S9A meter. If the modification is required, the meter must be released by the Telephone Company and sent to the Distributing House for modification since the installer is not equipped to make this change. If this is not desirable, the Telephone Company may prefer to order new S9A meters. A comparison of meter scales is shown on the following pages.

TERMINAL DESIGNATIONS



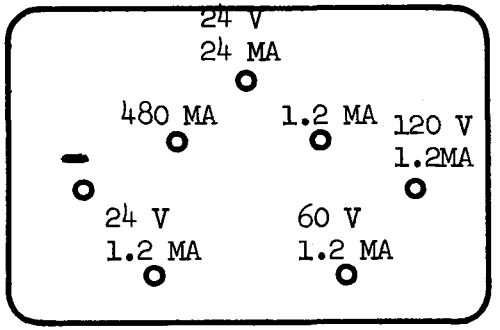
KS 1366

(Weston Model 57)



KS 13724

(Made from KS 1366)



S9A

(Western Electric Co.)

Existing KS-1366 meters may be converted to KS-13724 meters by forwarding to the **Distributing House.** These meters are no longer manufactured and cannot be ordered as new meters. The modification consists of changing the (24V 24MA) term to a 1.2 MA (Galvanometer) terminal, By means of an internal wiring change only, and restamping.

TABLE OF SCALE RANGES

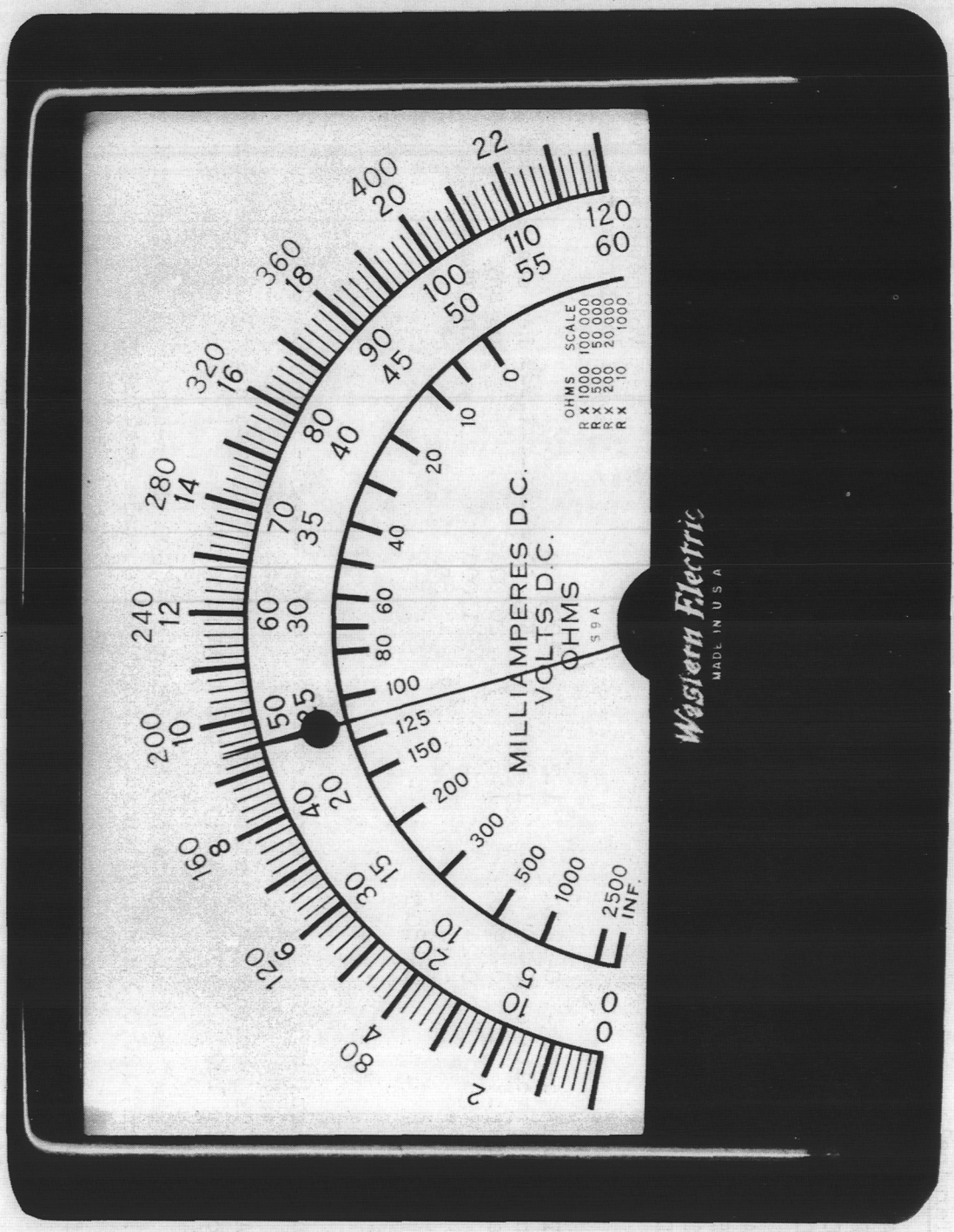
Meter	Terminals	Scale	MA	Resistance (Ohms)	Remarks	Used In
*KS-1366	A-E (-)	0-120V	1.2	100,000		J95002
	B-E	0-24V	1.2	20,000		A-1 to A-3
	C-E	0-24V	24	1,000		B-1 to B-3
	D-E	0-480MA	-	4		F-1 to Early F-8
						G-1 to G-4
**KS-13724	A-E (-)	0-120V	1.2	100,000		
	B-E	0-24V	1.2	20,000		
	C-E	Galv.	1.2	800	Used for dial speed testing, Electronic Voltmeter and Voltmeter Bridge Test	Late F-8 and Pos Modified in Field.
	D-E	0-480MA	-	4		
S9A	Terminals designated by voltage and current	0-120V	1.2	100,000		
		0-60V	1.2	50,000	New scale. Not provided on any of the Model 57 instruments.	F-9 to F-11 H-1
		0-24V	1.2	20,000		
		0-24V	24	1,000		
		Galv.	1.2	800		
		0-480MA	-	4		

*Same as instrument furnished for No. 12 type local test desks under List No. 12025.

**(A) 24V-24MA scale is obtained by shunting the 24V-1.2 MA winding with a 1053 OHM resistor by the operation of the 1000 OHM or 24 MA key in the test circuit.

**(B) The 60V (50000 ohm) reading is obtained by adding a 30,000 ohm resistor in series with the (24V, 1.2MA term) (20,000 winding) and dividing the 120 scale reading by 2.

(C) Price of S9A meter $127.00 (1963)
Cost of converting KS-1366 to KS-13724 meter 15.00 (estimated)


MILLIAMPERES D.C.
VOLTS D.C.
OHMS
S9A
Western Electric
MADE IN U.S.A.
OHMS SCALE
R X 1000 100 000
R X 500 50 000
R X 200 20 000
R X 10 1000
0
10
20
40
60
80
100
125
150
200
300
500
1000
2500
INF.
0
5
10
15
20
30
40
60
80
120
160
200
240
280
320
360
400
2
6
9
12
16
18
20
22
35
45
50
55
60
70
90
110
120

2.2 Establishing Test Connection to Subscriber Line

A clear path over tip and ring from the test desk to any subscriber line is provided by the test trunks appearing in the face of the Test Desk. There are three methods of establishing a connection to a subscriber line over a test trunk.

2.201 By patching a test trunk which terminates at the MDF to the protector at the office end.

2.202 By requesting an operator to connect a test trunk, which terminates in a switchboard to a subscriber line.

2.203 By pulsing directly from the test desk into a Test Distributor or a Dial pulsing or Key pulsing incoming test trunk circuit located at the office end.

2.3 Pulsing

There are three methods of pulsing:

2.301 "B" Switchboard Operation (no pulsing from LTD) when a test cord is inserted into a test trunk which terminates in a "B" switchboard, the required line is requested orally. The "B" operator key pulses the number into the "B" sender which directs the test trunk to the desired subscriber line. This method requires no special option in the test cord circuit. The "B" switchboard is rapidly becoming obsolete.

2.302 Dial Pulse Operation When the test cord is inserted into a test trunk which terminates in a dial pulse incoming test trunk at the office end and the desired line number is dialed from the test desk, the associated dial pulse terminating sender (Panel and No. 1 Crossbar) or register (No. 5 Crossbar) receives the dial pulses and directs the trunk to the dialed line. In Step-by-Step offices, dialing causes the test distributor and test connector to step to the dialed line.

The wiring for dial pulsing is furnished in the local cable of all vintages on No. 14 Local Test Desk and may be equipped as required. The 6E (10 P.P.S.) dial is standard for the local test desk. However, some of the early Panel and No. 1 Crossbar desks were equipped with 6F (20 P.P.S.) dials. If Step-by-Step offices or No. 5 Crossbar offices having test trunk and selector circuits SD25767-01 are to be tested from these desks, these dials must be changed to a 10 P.P.S. dial.

Dialing over the test cord is shown on the following drawings.

Test Cord Ckt	With PS-RLS	Without PS-RLS	Tel Ckt
SD90053-01	Fig. R	Fig. N (MD)*	SD90050-01 Fig D
SD90497-01	Fig. 8	Fig. 4 (MD)*	SD90050-01 Fig D
SD95612-01	Basic Fig 1		SD95754-01 Basic Fig 1

* Satisfactory for testing Panel & X-Bar offices when KP is not required.

Initial Application of Wiring in Local Cable

J95062A-1,B-1	(without PS-RLS)	Equipment Optional
J95002F-2,G-2	(with PS-RLS)	" "
J95002H-1	(with PS-RLS)	Equipped in Baisc List

2.303 Multi Frequency Key Pulse Operation (PEL 4782) (12-11-50)

When a test cord is inserted into a test trunk terminating in a multi frequency incoming test trunk at the office end and the desired line number is "Keyed Up" on the test position keyset, multi frequency pulses (each digit consisting of 2 out of 6 frequencies) are transmitted to the associated sender or register at the office end, which recognizes the pulses and directs the trunk to the desired subscriber line. When key pulsing is provided, Dial Pulsing should also be provided for operating the test trunk and selector circuit.

The MF Supply for the Keyset circuit SD95570-01 may be obtained from the MF Current Supply Bay which serves the Toll Switchboard if available, a multifrequency supply relay rack unit or from individual MF Signal Generator circuits.

These circuits are provided where only the 2/6 pulses for MF operation are required and no TOUCH-TONE lines are to be tested.

When TOUCH-TONE lines are to be tested, the supply is obtained from Generator circuit SD99328-01 which provides either 2/6 pulses for MF pulsing or 4X4 pulses for TOUCH-TONE testing as called for by the operation of the respective test keys. (See par. 2.418 TOUCH-TONE pulsing on subscriber line.)

MF Key pulsing over test cord is shown on the following drawings:

SD90053-01	"YE" Option
SD90497-01	"BK" Option
SD95612-01	Part of Main Figure
SD95570-01	Fig. 1 & 2 for MF pulsing only (See Par. 2.418)

Initial Application of Wiring in Local Cable

Positions made from J95002F-10 or later provide the MF Keyset feature with equipment for SD95570-01, Figs. 1 and 2 on an optional basis. When this circuit is required in positions made from earlier vintages, the wiring and equipment may be added. Some of the positions made prior to J95002F-10 do not provide sufficient room between the dial and the clock to accommodate the keyset. When mounting the keyset in these positions, it is necessary to move the dial to the left or modify the keyshelf per H502-142 as indicates on the respective J drawing for the position.

2.304 Extra Numbers Not in the Regular Subscriber Series

In No. 1 Crossbar Offices, test connections may be made to a subscriber line in either the "regular" or "extra number" series. Connection to No. 1 Crossbar subscriber lines in the extra number series requires the operation of the (REV) key of the primary or secondary test circuit. For other types of calls the (REV) key must be normal.

The (REV) key, operated, connects ground to the ring lead to indicate to the terminating equipment that the call is to a line in the extra number series. For dial pulsing, ground from the (REV) key is connected through operated contacts of the (PD) or (SD) relay and 1000 ohm resistor (BF) over the "X" lead through the telephone circuit to the ring. For MF pulsing ground from the (REV) key operates a relay in the MF keyset circuit over the "X" lead which grounds the ring lead.
This feature requires extra contacts on the (REV) key and (PD) and (SD) relays and an additional resistor and is shown on the following drawings.

SD90053-01 "AE" option (Fig. R) "ZR" option (Fig. 1)
SD90497-01 "B" option (Figs. 1 & 8) "D" option (Fig. 8)
SD95612-01 Included in basic Fig. 1.

Initial Application of Wiring in Local Cable

J95002F-6

2.4 Testing Features

The following is a brief description of the more common testing features of the primary and secondary test cord circuit. A more detailed description of these features may be found in BSP Section F43.221, F53.221, CD-95612-01, CD-90497-01 and CD-90053-01.

2.401 Line Insulation Breakdown Test

Operation of the BT1 key in the test cord circuit applies 200V potential from the breakdown test unit to the ring side of the line in graduated steps in series with the position voltmilliammeter. A breakdown is indicated by a meter reading. Outside limits are prescribed locally. Operation of the REV key applies the test to the other side of the line. Operation of the BT2 REV applies the test between tip and ring conductors.

The following line insulation breakdown circuits are in use:

SD90055-01	(MFR DISC)	(24V rels, 24V lamps)
SD95772-01	(STD)	(48V rels, 24 or 48V lamps)

This circuit is provided on the basis of one per four positions unless otherwise specified. Operation of this circuit in one position lights the busy lamp in the associated positions.

Application

This feature is available in all test desks.

2.402 Receiver Off-Hook Tone Application (Howler)

The primary and secondary test circuit is arranged to apply distinctive tone to the line over the secondary cord to attract the attention of the subscriber when the receiver is left off the hook.

This tone may be obtained from one of two sources:

a. The Power Howler through a Howler circuit.

b. The 400A Tone Generator through a 5A Timer.

A. The Howler Circuit (Now superseded by the 400A Tone Generator) is arranged to apply a raucous tone from the Power Howler circuit to the line in graduated steps of increasing volume when the (H) key is operated and to disconnect the tone at the end of the cycle or when the subscriber places the receiver on the hook.

The following howler circuits are now in use:

SD90057-01	(24V)	(MFR DISC)
SD25862-01	(48V)	(MFR DISC)
SD95773-01	(48V rel 24V or 48V lamp)	(MFR DISC)

These circuits are provided on the basis of one for each four positions of test desk unless otherwise specified. Seizure of the circuit by one position will light the busy lamp in the other three positions as an indication that the circuit is in use. The (S) lamp in the cord circuits will be extinguished when the receiver is placed on the hook.

B. The 400A Tone Generator shown on SD99303-01 is a transistorized circuit on a 2X23 inch mounting plate with a D type terminal strip. It consists of an oscillator, a pulse generator and a transistor amplifier SD99275-01 and produces a series of tones, most easily passed through the 500 type subsets, to attract the attention of the subscriber when the receiver is left off the hook.
The 400A Tone Generator is coded apparatus and together with the 5A Timer replaces the Howler circuit and Power Howler supply.
It has capacity for 42 simultaneous connections and in general one unit will be sufficient for an entire central office.
The 400A Tone Generator is connected to the cord circuit through a 5A Timer.

The 5A Timer shown on SD99304-01 is also coded apparatus and consists of a 2 X 23 inch mounting plate arranged to supply 6 separate circuits or 6 positions. Additional 5A Timers will be required when more than 6 positions are served.
Operation of the (H) key in the Primary and Secondary Test Circuit will start the timer which in turn will start the tone generator and apply tone to the line. After 40 to 70 seconds as determined by the timer or if the receiver is placed on the hook during application of the tone, the tone will be disconnected from the line and the circuit will not recycle until the (H) key is reoperated.

The (H) lamp in the cord circuit will flash during the time the tone is being applied and the (S) lamp will be extinguished when the receiver is placed on the hook.

Connection to the 5A Timer is shown on the following Primary and Secondary Cord Circuits:

SD90053-01 Issue 26 "YQ" wiring
SD90497-01 Issue 37 "YB" wiring
SD95612-01 Issue 10 "ZD" wiring

Due to the possibility of inducing noise into adjacent cable pairs, operation of the (DO) key in the Primary and Secondary Test circuit is arranged to disable the "Receiver Off-Hook Tone" feature when testing over a trunk to a distant office.

Application

All positions manufactured prior to 1964 are arranged to provide Howler tone only. These positions may be modified in the field to provide 400A generator tone.

The first application of shop wired positions arranged for the 5A timer and 400A tone generator will be made on J95002H-1 in 1964.

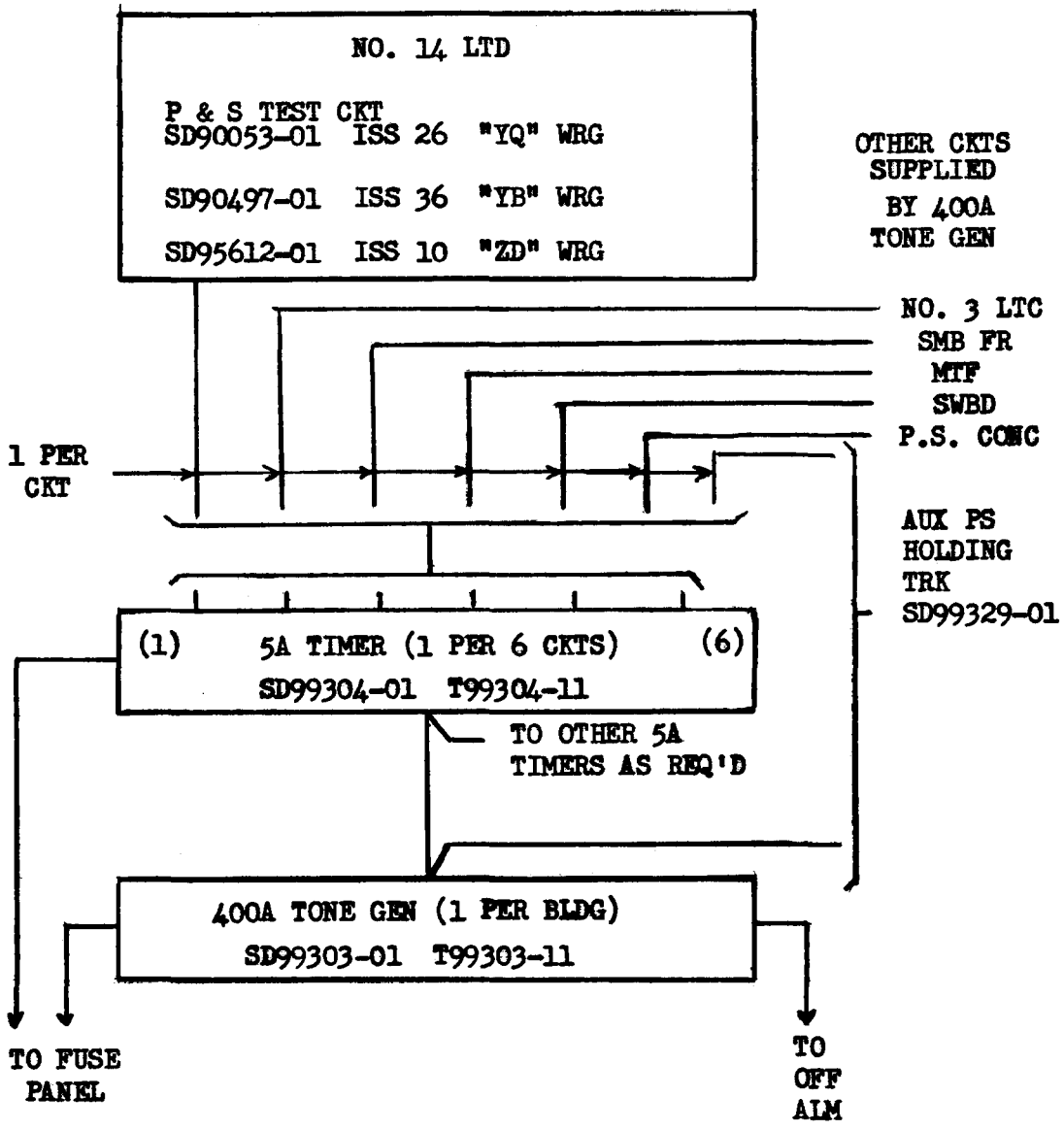
Due to the ineffectiveness of the Howler Tone on 500type sub sets and its high noise level, the manufacture of the Howler circuit has been discontinued. The 5A timer and 400A tone generator will be furnished for all new lineups.

When specified by the Telephone Company or when, at any time a new LTD position is ordered, the howler circuit will be replaced by the 5A timer and 400A tone generator on a Class "D" basis.

RECEIVER OFF HOOK TONE

(REPLACING HOWLER)

(PEL 7177)



NOTE: The 400A Tone Generator and 5A Timer are Coded Relay Rack Units, Each Consisting of One 2" X23" Mtg. Plt.

2.403 Dial Speed Testing

When the test desk operator is connected to a subscriber line, it is sometimes desirable to check the speed of the subscriber's dial from the test desk. The following equipment may be provided for this purpose:

a. 51 Type Dial Tester (A & M only for LTD)

The 51 type dial tester is a pendulum type device contained in a metal housing mounted on a wall or column. When the dial tester is seized and ready to receive dial pulses, a tone is placed on the subscriber line as an indication to start dialing. When the digit "0" is dialed, the pendulum releases on the first pulse and stops on the last pulse and the dial speed is indicated by tones applied by contacts on the pendulum depending upon the distance it swings.

Correct dial speed is indicated by ringing tone.

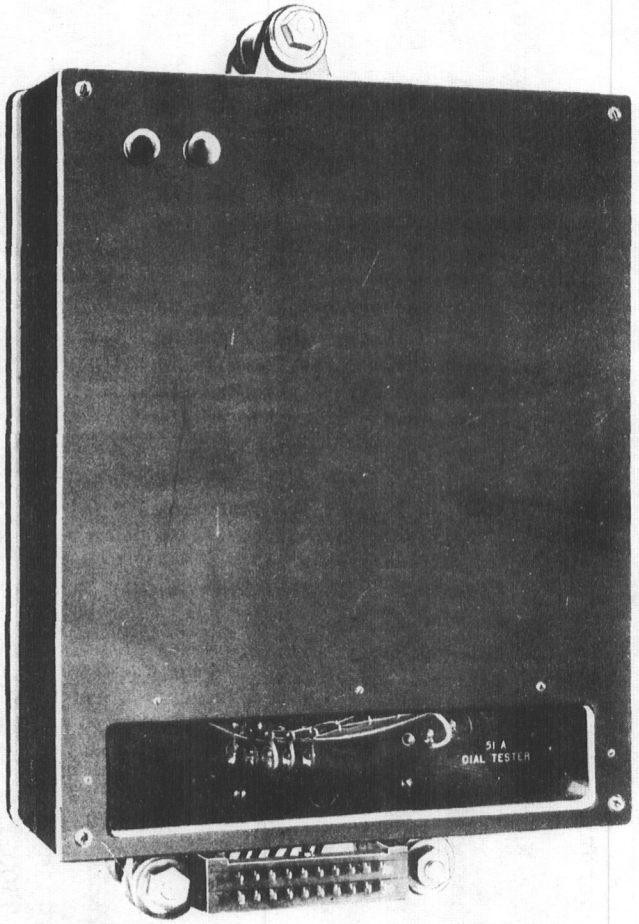
Slow dial speed is indicated by slowly interrupted dial tone.

The 51 type dial tester is normally reached by a repair man at a subscriber station by dialing the station ringer test circuit service code and then dialing another digit which will connect an idle dial tester to the line. The speed of the subscriber dial may then be tested as described above.

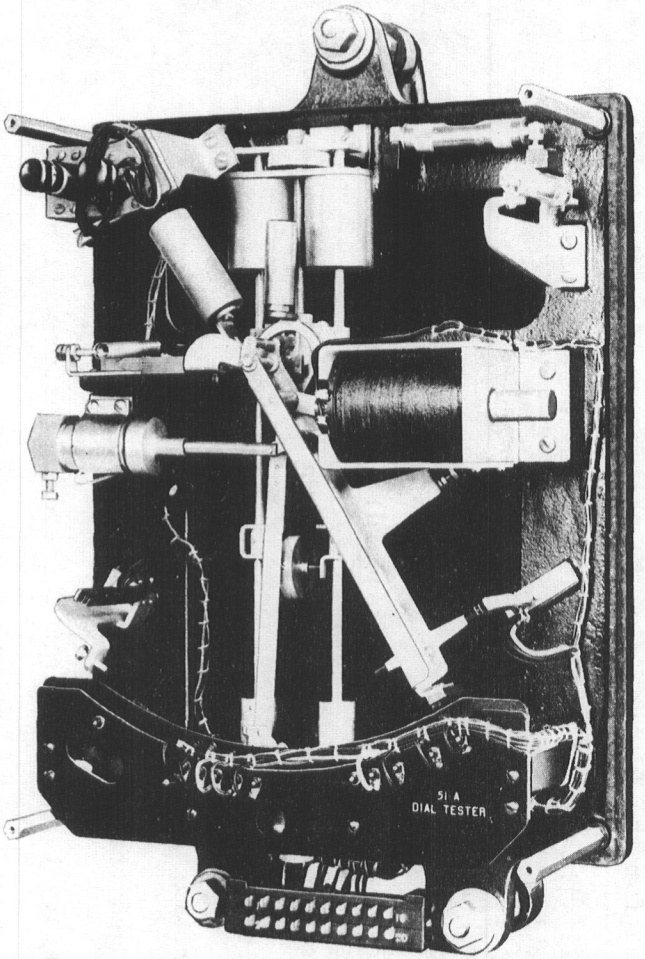
Earlier test desks were arranged to share the 51 type dial tester with the ringer test circuit; each ringer test circuit and each test desk position having access to a group of dial testers through a separate appearance on the rotary switch of the dial tester circuit. Operation of a key in the position test circuit would seize an idle dial tester for making dial speed tests on a subscriber line connected to the cord circuit and the tones would be audible at both the subscriber station and the Local Test Desk.

Connection of the 51 type dial tester to the test desk was rated "A & M only" in 1948. It may be provided only for addition to a lineup where this feature is installed. It is available in all vintages of local test desk positions but can be provided in J95002H only when used as additional positions to an existing lineup. It cannot be provided in a new lineup consisting entirely of positions per J95002H.

The 51 type dial tester has a range of 2250 ohms (750 ohm trunk loop and 1500 ohm subscriber loop) and is superseded by the meter type dial tester for the Local Test Desk. Its use with the ringer test circuit is still standard for Panel, Step-by-Step and No. 1 Crossbar offices. It is not used on No. 5 Crossbar offices.



51 - A DIAL TESTER



51-A DIAL TESTER - COVER REMOVED

Initial Application of Wiring in Local Cable

Wiring for the 51 type dial tester feature is provided in all vintages of LTD No. 14 and may be equipped on an optional basis for additions only where this feature is in use.

b. Meter Type Dial Tester (Standard) (PEM 3690) (11-16-48)

The meter type dial tester is shown on SD96335-01 and consists of a single mounting plate of relay equipment comprising a capacitor charge and discharge circuit so arranged that when the proper keys are operated in the secondary test cord circuit the dial tester will be connected to the subscriber line under test. The speed of the subscriber dial in pulses per second may then be read directly on the 24V scale of the position volt-milliammeter which deflects momentarily when the digit "0" is dialed. This dial tester has an operating range of 3000 ohms (1500 ohm trunk loop and 1500 ohm subscriber loop). When this circuit is provided, the position meter must be either a KS-13724 or an S9A meter. The meter type dial test feature is shown on the following test cord circuits:

SD90053-01 Fig. T
SD90497-01 Fig. F (MFR DISC) Repl by Fig. K
(Fig. K is an improvement in design)
SD95612-01 Fig. 14 & C

Initial Application of Wiring in Local Cable

J95002F-8 (SD90497-01 Fig. F) Equipment optional
J95002F-9 (SD90497-01 Fig. K) Equipment optional

c. Dial Testing Not Required

In manual areas and areas where subscriber dials are tested locally by portable stroboscope or other means, dial testing from the local test desk is not required. In this case, the dial tester unit is not provided. The dial tester key units however are part of the standard test cord keys and are always furnished. The unused key units are made inoperative by means of 10A guards normally ordered with each desk for blocking unused key units.

2.404 TOUCH-TONE Station Test

A feature is available in the Local Test Desk for testing the frequency and tone level of the digits keyed from a TOUCH-TONE subscriber telephone set.

The connection to the subscriber line is established over a test trunk in the usual manner. After the test procedure has been explained to the customer, the (TT) key in the Primary and Secondary test circuit is operated placing positive potential on the sleeve lead which operates a relay in the test trunk and lights the (TTB) lamp as an indication to other positions that the TOUCH-TONE Test Circuit associated with that office group is in use. This potential also activates the TOUCH-TONE Frequency Applique circuit which connects battery and ground to the line, bridges a monitoring amplifier across the Tip and Ring for monitoring from the desk and causes the test connector to sieze an idle TOUCH-TONE Frequency test circuit, sending dial tone to the subscriber.

The customer upon hearing the dial tone proceeds to key in sequence the digits 0 to 9. The test circuit examines the sequence and returns an audible signal to both the test desk and the customer, indicating that the test was good or bad.

Restoration of the (TT) key restores the TOUCH-TONE test circuit to normal.

The TOUCH-TONE Station test feature is shown in the following options:

SD95612-01	"ZB" Option
SD90497-01	"YD" Option with SD90050-01 Fig. K
SD90053-01	To Be Changed Later

These options also include the 4 X 4 key for TOUCH-TONE Pulsing on Subscriber line described in paragraph 2.418.

Initial Application of Wiring in Local Cable

This feature will be available in the early 1964 production of J95002H-1.

MODIFICATION OF LTD FOR TESTING TOUCH TONE LINES (SEE NOTE 1)

(1) TOUCH TONE SET TEST

LTD		RELAY RACK	MDF
POSITION	JACK FIELD		

PRI & SEC TEST CKT

SD95612-01 Iss. 10
MOD (ZA) TO (ZB) OPT

SD90497-01 Iss. 37
MOD (YC) TO (YD) OPT
SD90050-01 TEL CKT Iss. 25
ADD FIG. K
SD90053-01 Iss.

CHG A1UP TO A1ABP KEY
ADD 1-18DA RES (TT)
ADD (CC+) FUSE

O.G. TEST TRK SD95737-01 ISS. 11

FIG. 2(NO CHG)

FIG. 1

(TTB)
ADD FIG 5 (1 PER OFF E/W T. TONE)
30LS, 101LS MTG
8A LC,
2Y or A1 LP
MTD IN PANEL BELOW METER

ADD FIG. 4 (TOUCH TONE BUSY TST)
" 1 - 242 JK
" 1 - 19RT RES
" 1 - 280AF REL

J93016CB-1 FOR NEW CKTS
H531-208 FOR MOD EXISTING CKTS *

X CONN TO APPLIQUE CKT SD99321-01 IN SAME OR DIST BLDG DIRECT OR THRU TST TRK SEL CKT

(2) TOUCH TONE PULSING ON SUBS LINE (SIMULATING TOUCH TONE SUBSCRIBER PULSING) (SEE NOTE 1)

MF KEY SET CKT SD95570-01 Iss. 6

MOD. FIG.2 TO AGREE WITH FIG.4 *
CHG 499H TO 499J KEY
CHG M7C TO M13A CORD
CHG 34A TO 34B CONN BLK

CHG FIG.1 TO FIG.3
J93016CC-1 Iss.1 FOR NEW CKTS *
REPLACE J93016J-1,2) FOR MOD EXISTING
BY J93016CC-1) CKTS

ADD SIG GEN CKT SD99328-01
J99235BK-1 (1 PER POS) *
IN PLACE OF CONN TO MF CURRENT SUPPLY OR MF SIG GEN

NOTE 1: This block diagram shows a LTD which at present is equipped with a MF keyset. If the LTD to be modified is not arranged for MF keypulsing, the primary and secondary test circuit must be modified for this feature and the equipment marked with a Asterisk (*) must be added.

2.405 Coin Control Test

Operation of the (CC) or (CR) key in the test cord circuit applies coin collect or coin return potential over the secondary cord to the coin box magnet in the coin telephone set in series with the 480MA winding of the position volt-milliammeter and the position rheostat. By adjusting the rheostat to the proper operate or non-operate current, the functioning of coin box magnet can be checked. This test is part of the basic test circuit and is not an option. The desk is normally connected for positive potential for coin collect and negative for coin return. In areas where negative potential is used for coin collect a reversal of leads at the (CC) and (CR) keys was made by the installer in positions made from J95002A, B and F and is made by the shop in positions made from J95002H. In post-pay coin offices where coin potential is not provided this test is not used.

2.406 Coin Trunk Test (SXS Office) (PEM 5126) (11-30-53)

This test enables the test desk operator to test the functioning of the coin trunks in Step-by-Step offices upon reports of collect or return failures, before sending a maintenance man to the subscribers station. The test desk man establishes a test connection to the line in trouble and dials a "charge" or "no charge" termination, then simulates a disconnection and checks the polarity of coin potential sent out by the coin trunk circuit. Since the same coin trunk may not be seized on each call the test is repeated until a satisfactory check is obtained.

This test involves the addition of a (CTT) (coin trunk test) key position on the opposite side of the (DSL) key unit and a small wiring change. This feature is shown on the following circuits.

SD90053-01 "YO" Option
SD90497-01 "AN" and "ZZ" Option
SD95612-01 Included in Basic Figure

Initial Application of Wiring in Local Cable

J95002F-10 Equipment Optional
J95002F-11 & H Included in the Basic List

2.407 Permanent Signal Release (SXS Offices)

When a test connection is established over the secondary test cord via a test distributor to a "line on permanent signal" a release condition may be applied to the first selector and connector by operating the PS/RLS key in the test desk.

Release is indicated when the (S) lamp is extinguished. This feature is shown on the following test cord circuits:

SD90053-01 Fig. R which replaced Fig. N in 1932. (After the circuit was rated MD)
SD90497-01 Fig. 8 which replaced Fig. 4 in 1932.
SD95612-01 in the basic circuit.

Initial Application of Wiring in Local Cable

J95002F-2 and G-2 in basic list

2.408 Conductor Identification Tone (Standard) (PEM 4933) (4-13-53)

The conductor identification tone unit produces a 500 cycle tone warbled at 7 cycles per second which is supplied to jacks multipled through the main distributing frame. One

jack supplies high level tone and the other low level tone which may be connected to a cable pair for identification purposes. In offices having a local test desk, this tone may also be connected to the LTD cord circuit to provide an identification tone on the sounder cord in place of low tone furnished in early desks.

Modification of SD90497-01 for conductor identification tone requires the replacement of a key in the key shelf to obtain an additional contact on the (S) (Sounder) key unit, the addition of a relay (SR2), an 18BH resistor (SR1) and a change in the (TN) capacitor to 1MF. This provides a start lead to the CIDT circuit. Modification of SD90053-01 however, requires only a change in the (TN) capacitor since, for economic reasons, the start lead is not provided and the CIDT circuit must be connected for continuous operation. SD95612-01 provides connections to the CIDT circuit with a start lead as a standard option and connection to low tone as an option for additions to lineups where low tone is in use.

Initial Application of Wiring in Local Cable

J95002F-10

2.409 Tube Type Subset Test (Superimposed Ringing)

Cold cathode tube type subsets are used for 4 party full selective and 8 party semi-selective subscriber lines. A test for these sets is provided by the operation of the (STA+) or (STA-) key in the test desk which applies 116V+ or 116V- potential in series with the position meter to the RING of the line.

The presence of a (+) or (-) party cold cathode subset on the line is indicated by a deflection on the position voltmeter. By the operation of the (REV) key, stations on the TIP side of the line may be checked.

Initial Application of Wiring in Local Cable

Wiring for this feature is provided in all locations made from J95002F-2 or later.

2.410 Relay Type Subset Test (Superimposed Ringing)

Prior to the development of tube type subsets, relay type subsets were used for 4 party full selective and 8 party semi-selective lines. These sets are still in use in some areas. A test of these lines is provided by the (SSRT) (subset relay test) key and associated equipment.

This feature is wired in the local cables of all No. 14 Local Test Desks and is equipped on an optional basis. Either the tube type subset test or the relay type subset test feature or both may be provided in the same position or neither may be furnished, as required.

2.411 Condenser Type Subsets (AC-DC Ringing)

Subsets having a capacitor in series with a ringer are used on individual, two party and four party semi-selective lines and require no special testing feature.

The wiring for this feature is provided in the local cable of all vintages of the local test desk. The equipment is provided on an optional basis in positions made from J95002A, B, F and G and is provided in the basic list of positions made from J95002H.

2.412 Metallic - 60 Volt Scale - AC Voltage Test With or Without Electronic Voltmeter Test (PEL 4782) (12-11-50)

In the latter part of 1950, improvements in the test circuits of the local test desk were made to add the following testing features:

Metallic Test - to permit tests to be made with ungrounded battery to facilitate checking leaks across subscriber line pairs and conductor to ground leakage, etc.

60 Volt Scale - to facilitate checking insulation resistance of subscriber lines equipped with tube type subsets without firing the tube.

AC Voltage Test - to provide a means of measuring stray AC potentials on subscriber lines.

Electronic Voltmeter Test - to provide a more precise means of checking high resistance faults such as those found by the automatic line insulation test circuit and for measuring very high insulation resistance.

These features are shown in the following options:

SD90053-01 - Fig. 4, U & V
SD90497-01 - Fig. L, J & 11
SD95612-01 - In Basic Fig. 1

The position equipment for all four features is included in the same figure and must be provided together. The position equipment is generally provided in all positions of the lineup.

2.413 Electronic Voltmeter Test

The Electronic Voltmeter circuit SD95596-01 is optional and is generally provided only for one or two positions in the lineup as specified by the Telephone Company.

When the electronic voltmeter relay rack unit is provided, a talking line such as SD96074-01 and SD95734-01 is required between the test desk and the relay rack bay on which the electronic voltmeter unit is mounted. This circuit is used for communication between the desk and the relay rack when adjusting the potentiometers on the EVM unit to meet 80 and 100 volt readings on the position voltmeter.

Initial Application of Wiring in Local Cable

These features are included in the basic lists of positions made from J95002F-10 or later. Positions made prior to J95002F-10 may be modified to add these features when requested by the Telephone Company.

The modification of existing positions consists briefly of changing four A-1 type keys in the keyshelf, replacing an N4A with an N8A terminal strip, replacing a mounting plate on the rear equipment, the addition of a 59A fuse and pigtail resistors and the conversion of the position voltmilliammeter KS-1366 to a KS-13724 meter or replacement with a Western Electric Company S9A meter. The conversion or replacement of the meter is also required for the meter type dial test feature and the voltmeter bridge test and may have already been made if these features have been provided.

The outside of section equipment consists of the addition of a separate 100 volt test battery for each position, with a tap at 50 volts. The electronic voltmeter feature supersedes the electronic voltmeter shown on Bell Telephone of Pennsylvania drawing 13-W-734 which should be removed if provided.

Two improvements were made on SD90497-01 affecting the ELVM feature after the drawing was rated "Manufacture Discontinued". On SD90497-01 Issue 34D, "BZ" wiring was added to provide non-interference from the (RCCI) key when the (ELVM) key is operated.

On SD91497-01 Issue 35B "AT" wiring and apparatus was added to prevent inductive disturbance when the relay rack is located at a distance from the desk.

This wiring and equipment should be provided where the ELVM feature is provided for the first time in position having this circuit and in existing installation when requested by the Telephone Company.

Initial Application of Wiring in Local Cable

The changes per SD90497-01 Issue 34 and 35 were never made by the shop but may be made in the field when required. Similar changes were made on SD95612-01 Issue 8B and are included in J95002H-1 (List AE).

2.414 Distant Office Testing (Centralized Testing) (Off-Premise Testing)

The (DO) Key, located below the meter, provides the required compensation and switching arrangements for testing over test trunks to distant offices.

2.415 Extension of Test Trunk Range to 1500 Ohms (PEM 5152) (1-5-56)

Until 1953 the maximum trunk loop range to the distant office was 750 ohms. In 1953, the range was increased to 1500 ohms. Briefly, the modification consists of the following changes:

Test Trunks - readjustment of the sleeve relay to provide increased signalling range.

Test Cord Circuit

a) Revision of the transmission test feature which involves only a change in strapping of the compensating resistors in the test cord circuit.

b) Extension of the supervisory range which involves only relay adjustments. (Adjustment "B" in the circuit requirement table.)

c) Revision of the line relay test which requires the addition of 4-552A Keys and the removal of 4 resistors. These keys are mounted below the S9A meter when provided or in any available space in an adjacent panel when the round Weston model 57 meter is provided. This feature is shown on the following test cord circuits:

SD95612-01- In Basic Fig.
SD90497-01- Fig. P
SD90053-01- Fig. W

d) The (R) relay has been provided with an additional contact to remove the 9000 ohm resistance ground on the sleeve except during the ringing interval. This feature is shown on the following drawings:

Sec Ring Ckt SD95741-01 in basic Fig.

Tst Cord Ckt SD90497-01 Fig. N when "BG" option is used, no change when "M" option is used.

Sec Ring Ckt SD90061-01 to -06 (Not Chgd)

e) The coin booster battery voltage has been increased from max 20V to max 45V to compensate for the increased loop resistance. The voltage will be specified by the Telephone Company.

Line Relay Test

The line relay test is a part of the basic Primary and Secondary test circuit. When the circuit is connected to a subscriber line, the (3WO) and (T) keys operated open the sleeve lead to release the cut-off relay and place 1600 ohms across the tip and ring to operate the line relay, in which case dial tone will be heard.

Prior to 1954, the 1500 ohm test was applied by a fixed resistor with the (DO) key normal and by another set of fixed resistors which when added to the trunk loop would equal 1500 ohms with the (DO) key operated. Compensating resistance circuit SD90054-01 was added to the short loops to make the resistance of all trunks approximately equal. The fixed resistor method has since been replaced by a variable resistor arrangement.

The variable resistor line relay test consists of four 552A keys designated 100, 200, 400, 800 which permit a resistance of from 0 to 1500 ohms which can be varied in steps of 100 ohms to be inserted in series with the line

relay for making a line relay test. When testing a line over a trunk to a distant office a resistance can be selected which when added to the trunk resistance, will equal 1500 ohms.

The variable line relay test was first provided by means of a Yaxley rotary switch panel which was superseded after about a year by the 552A keys and is no longer manufactured. The 552A key arrangement eliminates the need for the compensating resistance circuit SD90054-01 provided in older installations.

Initial Application of Wiring in Local Cable

Positions made from J95002F-11 provide for testing over 1500 ohm trunk loops in list 32. In J95002F-10 and F-11, this feature is provided in lists 29 and 30 using a rotary switch which was later replaced by four 552A keys (List 32 J95002F-11). The switch panel per ED92547-10 (SD90497-01 Fig. 10 "BU" or "BT" option) may be retained if provided unless a change is desired for uniformity, however, it is no longer available and should not be ordered for new work. J95002A, B, F-1 to F-9 and G1 to G4 are arranged for 750 ohm maximum trunk loop. In some cases these desks are operating over trunk loops exceeding 750 ohm without modification except for relay adjustments. However, when requested by the Telephone Company, desks made from J95002A, B or F may be modified for testing over a 1500 ohm trunk loop as described above.

Modification of existing desks to increase the trunk range is required only when new offices in the area are to be tested over trunk loops exceeding 750 ohms. J95002H provides for testing one 1500 ohm trunk loop in the basic list.

2.416 Control of Test Trunk Ringing (Remote Control Ringing)

When the ringing voltage characteristic of the office to be tested differs from that of the desk office or when the trunk loop resistance will cause the tripping range of the secondary ringing circuit to be exceeded, Test Trunk Ringing Circuit SD96474-01 is provided at the distant office ahead of the test circuit to repeat the ringing signal received from the LTD with ringing current from the local office ringing plant. The requirements for providing test trunk ringing are covered in a note on the office key sheets and are provided, in general, when the loop resistance between the LTD and the distant office exceeds:

A) 300 ohms in Semi-Selective Offices or Full Selective Offices in which all 4 party lines are E/W tube type subsets.

B) 200 ohms in full selective offices in which some lines have relay type subsets.

The test trunk ringing circuit is controlled from the LTD by the application of ringing current over the T and R leads and 45V positive potential over the sleeve lead when the secondary ringing key is operated.

In early test desks positive potential was obtained from 45V+ dry cells now rated (A and M only). In later circuits, the positive potential is derived from positive coin potential obtained from the center tap of a voltage divider consisting of two 9000 ohm resistors in series. In test desks of J95002F series, this feature is an option in the test cord circuit SD90497-01.

In the J95002A, B series desks, this feature is an option shown on the secondary ringing circuit SD90061-01 to -06.

On positions of the J95002H series, this feature is a part of the basic secondary ringing circuit SD95741-01 and is always provided.

Initial Application of Wiring in Local Cable

J95002A-1 - using 45V+ dry battery

J95002F-8 - using position coin potential

2.417 Dialing on Subscriber Lines (Simulating Subscriber Dialing)

This feature enables the test desk operator, when connected to a subscriber line, to dial into the office equipment, simulating the subscriber dialing. It is not required for Panel Office Testing, but is mandatory for testing in Step-by-Step and Crossbar Offices. The feature consists of a (DSL) key unit and 2 relays, and is shown on the following cord circuits:

SD95612-01 - in basic figure
SD90497-01 - Figure 10
SD90053-01 - Figure 2

Initial Application of Wiring in Local Cable

The dialing on subscriber line feature is furnished as part of the basic list in desks made from J95002H. In

desks made from J95002F-6 or later, wiring is provided in local cable and the equipment is ordered on an optional basis. In desks made prior to J95002F-6, this feature was not wired.

2.418 TOUCH-TONE Pulsing on Sub-Lines
(Simulating TOUCH-TONE Subscriber Pulsing)

This feature enables the test desk operator when connected to a TOUCH-TONE subscriber line, to pulse into the office equipment simulating a TOUCH-TONE subscriber originating a call. The arrangement is the same as for dialing on subscriber lines except that a (4 X 4) key is required to switch from rotary dialing to TOUCH-TONE pulsing using the MF keyset. The 4 X 4 key is part of the changes required for testing TOUCH-TONE lines shown on the Primary and Secondary test circuits described in paragraph 2.404.

In order to provide the 4 X 4 pulses, Figures 3 and 4 must be provided in the MF keyset circuit SD95570-01. The MF pulses and the 4 X 4 TOUCH-TONE pulses are obtained from Signal Generator circuit SD99328-01 in this case.

Initial Application of Wiring in Local Cable

Wiring for TOUCH-TONE testing will be provided in the local cable of shop production of J95002H-1 about mid 1964 (estimate).

2.419 Remote Testing
(Over regular telephone switching network or a composite or duplex signalling or carrier facility)

The remote testing feature is designed for testing distant offices from a Central Test Desk where the DC resistance limitation of conventional test trunks would be exceeded. It provides a means of testing subscriber lines in a distant exchange via the regular telephone switching network or over a composite or duplex signalling or carrier facility. Its range is virtually unlimited.

This feature is in the development stage at the time of this issue and the following information is general and subject to change.

The remote testing feature requires the addition of a new test trunk or line circuit for remote testing, an outgoing remote testing circuit, and modification of the primary and secondary test circuit at the desk end and the addition of a far end test trunk or line circuit and an incoming remote testing circuit at the distant office. Briefly, the operation is as follows:

When testing over regular telephone facilities, the telephone number assigned to the far end test trunk or line circuit is dialed over one of the regular talking lines at the local test desk. This triggers the repertory dialer in the far end test trunk or line circuit causing it to dial the telephone number assigned to the test trunk or line circuit in the desk office, thus connecting the incoming remote testing circuit to the test desk via the regular telephone network. This procedure is designed to guard against the possibility of accidental or fraudulent use of

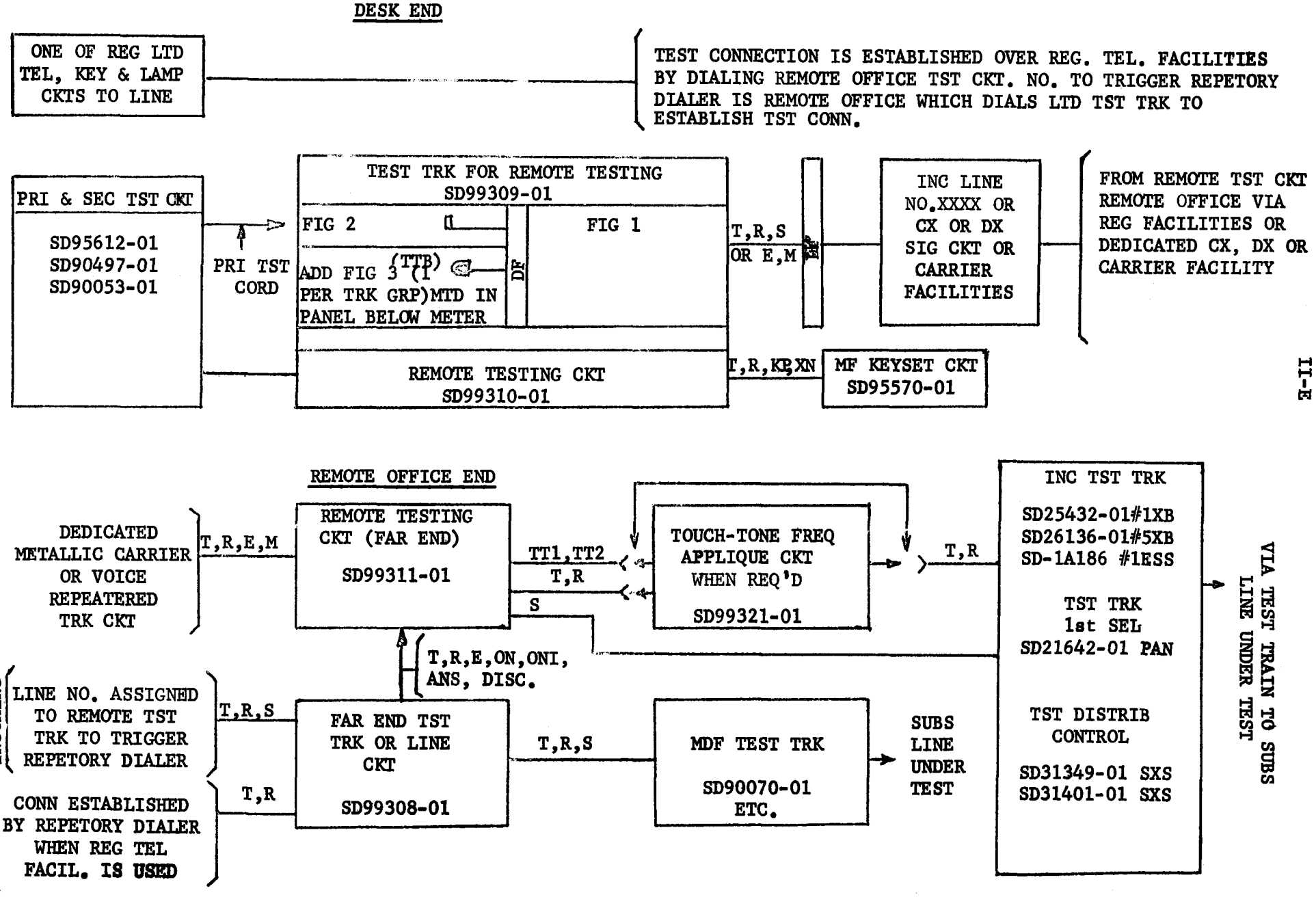
the equipment to complete an unauthorized call. When a dedicated CX, DX or carrier facility is used for a test trunk between the desk and the remote office, the far end test trunk or line circuit is not required.

The test connection to the subscriber line in the distant office is completed over the local test train by dialing or MF pulsing over the test cord in the usual manner.

Testing is performed the same as for conventional testing. Additional contacts on the test keys in the desk cause multitone code signals to be sent to the remote office test circuit which recognizes the code and sets up the corresponding test on the subscriber line. The resultant meter reading is applied to a current controlled oscillator and a related frequency is sent back over the network to the desk office where it is translated by a frequency detector circuit to a corresponding DC voltage and indicated on the position meter.

When the test key in the desk is restored, another code of multitone signals is transmitted to the distant office to restore the incoming remote test circuit ready for the next test. In this manner, some 31 tests may be made on the subscriber line. The sending circuit will provide sufficient codes for 48 tests. The circuit arrangement is shown graphically in the following block diagrams.

REMOTE TESTING
(VIA REGULAR TEL. FACILITIES OR DEDICATED DX, CX, OR CARRIER FACILITY)


DESK END
ONE OF REG LTD TEL, KEY & LAMP CKTS TO LINE
TEST CONNECTION IS ESTABLISHED OVER REG. TEL. FACILITIES BY DIALING REMOTE OFFICE TST CKT. NO. TO TRIGGER REPETORY DIALER IS REMOTE OFFICE WHICH DIALS LTD TST TRK TO ESTABLISH TST CONN.
PRI & SEC TST CKT
SD95612-01
SD90497-01
SD90053-01
PRI TST CORD
TEST TRK FOR REMOTE TESTING
SD99309-01
FIG 2
FIG 1
DF
ADD FIG 3 (1 (TTB) PER TRK GRP) MTD IN PANEL BELOW METER
T,R,S OR E,M
INC LINE NO.XXXX OR CX OR DX SIG CKT OR CARRIER FACILITIES
FROM REMOTE TST CKT REMOTE OFFICE VIA REG FACILITIES OR DEDICATED CX, DX OR CARRIER FACILITY
REMOTE TESTING CKT
SD99310-01
T,R,KP,XN
MF KEYSET CKT
SD95570-01
REMOTE OFFICE END
DEDICATED METALLIC CARRIER OR VOICE REPEATERED TRK CKT
T,R,E,M
REMOTE TESTING CKT (FAR END)
SD99311-01
TT1,TT2
T,R
S
TOUCH-TONE FREQ APPLIQUE CKT WHEN REQ'D
SD99321-01
T,R
INC TST TRK
SD25432-01#1XB
SD26136-01#5XB
SD-1A186 #1ESS
TST TRK 1st SEL
SD21642-01 PAN
TST DISTRIB CONTROL
SD31349-01 SXS
SD31401-01 SXS
VIA TEST TRAIN TO SUBS LINE UNDER TEST
T,R,E,ON,ONI, ANS, DISC.
INCOMING
LINE NO. ASSIGNED TO REMOTE TST TRK TO TRIGGER REPETORY DIALER
T,R,S
FAR END TST TRK OR LINE CKT
SD99308-01
T,R,S
MDF TEST TRK
SD90070-01 ETC.
SUBS LINE UNDER TEST
OUTGOING
T,R
CONN ESTABLISHED BY REPETORY DIALER WHEN REG TEL FACIL. IS USED

II-E

2.420 Framework Ground

The iron framework of the local desk lineup is grounded by means of a #2 AWG stranded single conductor flameproof wire terminated at the head end position on a lug furnished as end of lineup parts ordered on the desk J drawing and shown on ED90236-30. The other end is terminated on a ground panel on the fuse bay in Step-by-Step, Manual, Panel and #1 Crossbar offices or on the nearest aisle ground feeder in a #5 Crossbar office. The grounding circuit is shown in the following figures on the test cord wiring diagrams:

T90053-14	Figure 13
T90497-15	Figure 6 or
-25	Figure 6
T95612-17	Figure HE

2.421 VARIATIONS IN APPARATUS LOCATION

Apparatus	Location		
	J95002A,B SD90053-01	J95002F,G SD90497-01	J95002H SD95612-01
18ES Res (AV)	Mtd with(P)Bat	Mtd with(P)Bat	Not Req'd
13B Res Lp (L)			
(Bat) Jk	In Front Eqpt	In Front Eqpt	Not Req'd
13L Res Lp (S+)	In Rear Eqpt	In Rear Eqpt	On Bat Eqpt
13L Res Lp (S-)			
13B Res Lp (B)	In Rear Eqpt	In Rear Eqpt for Bat in pos on RR for Bat on RR	On Bat Eqpt
71A Res (ST)(SR)(PT)(PR)	On RR	On RR	In Rear Eqpt
18EA Res (BB)(BH) & Rel (R) for control of TST Trk ringing	Shown on Sec Ringing Ckt Mtd on RR	Shown on Tst CD Ckt Mtd in Pos	Shown on Sec Ringing Ckt Mtd on RR
E1036 Rel (FL) (1 Per Lineup)	On RR	On RR	Not Req'd

2.5 Test Batteries

The following test batteries are required for the Local Test Desk:

2.501 For Each Wheatstone Bridge Position

One 200V test battery (block type) with taps at 20V, 50V, 100V and 200V.

This battery serves the test cord circuit and Wheatstone Bridge circuit of one position only. It may serve the breakdown test circuit also in a lineup consisting of a single position equipped with a Wheatstone Bridge.

2.502 For Each Test Position (Pos not E/W W.B.)

One 100V test battery (block type) with taps at 50V and 100V. This battery serves the test cord circuit of one test position only.

2.503 For Each 8 Positions (Common Test Bat) (P)

One 200V test battery (block type) negative grounded, with taps at 20V and 200V. This battery serves the breakdown test circuits and cord circuits of a maximum of 8 positions. Other taps are provided on this battery as follows:

a) 116V+ for the plate supply of the Electronic Voltmeter RR units when furnished. This tap is also required for the tube type subset test in 4-party full selective offices. (In #1 Step-by-Step office where the coin voltage is regulated within 116-120V, coin supply may be used instead for the tube type subset test.)

(Coin supply in Panel offices is usually 110V, #1 Crossbar 120V non regulated, #5 Crossbar 130V which are outside of these limits and cannot be used for the tube type subset test.)

b) 20V, 100V, 116V+ and 200V supply may be taken from this battery to serve test frames and No. 3 local test cabinets in the same building when required.

c) One 116V - Test Battery (N) (block type) (positive grounded) is required for the tube type subset test in 4-party full selective offices. (In office where the coin voltage is regulated within 116-120V coin supply may be used in place of this battery.) This battery, when furnished, may also serve test frames and No. 3 local test cabinets located in the same building.

2.504 For the Entire Lineup

a) Coin Booster Battery for testing coin lines in distant offices, one 0-45V+ and one 0-45V- battery composed of No. 6 dry cells (1½ volts each) connected in series with the coin voltage is required to compensate for trunk loop loss and earth potential between offices. (45V is based on 1500 ohm loop and +15V earth potential. The voltage required should be specified by the Telephone Company.)

b) Auxiliary Power Ringing Circuit Battery

One 42-46V+ and one 42-46V- battery (No. 6 dry cells) in series with 85V± continuous ringing (SD95747-01) is required to provide a source of superimposed ringing voltage for ringing 4-party full selective and 8-party semi-selective lines in a distant office from a desk located in an office where superimposed ringing is not available.

2.505 Location of Batteries

a) 8 or Less Positions

Batteries per Items 2.501 to 2.503 are usually located in trays on the 7 inch cable rack in the rear of the desk for a lineup of 8 or less positions. A maximum of one double tier tray (200V battery) may be located in one position.

These batteries may also be located on the relay rack or in a battery cabinet when specified.

b) More than 8 Positions

In a lineup of more than 8 positions, the cables to position 9 and up are run on the 7 inch cable rack in the rear of the positions and the batteries per Items 2.501 to 2.503 must be located on the relay rack or in a battery cabinet.

The No. 6 type dry cell batteries of Item 2.504 are always located on the relay rack or in a battery cabinet. Library Bureau battery cabinets are seldom used and are provided only when requested by the Telephone Company.

2.506 Test Battery Equipment Drawings

ED92966-( ) - Batteries in rear of position

ED92956-( ) - Batteries on relay rack

ED90642-( ) - Batteries in filing type battery cabinet

2.507 Batteries for Special Combinations of Positions

Local test desk positions per J95002A, B and F (test circuits SD90053-01 and SD90497-01) require an 18ES res (AV) and a 13B res lamp (L) connected to a (BAT TST) jack located in the first test position of each 8 positions and in each Wheatstone Bridge position, to load the 100V battery when testing battery voltage from the position.

This equipment is not required for positions per J95002H (SD95612-01) and is not provided on test battery tray equipment ED92966-10 or RR equipment ED92956-10. The 200V test battery for the Wheatstone Bridge positions should be wired in accordance with the particular test cord circuit in that position. The common test battery for a group of 8 positions should be provided in accordance with the test cord circuit used in the first test position of the group and multiples through 8 positions which may be of various vintages. On a lineup consisting of a single Wheatstone Bridge position, the 200V WB position battery may also be used for the breakdown test unit.

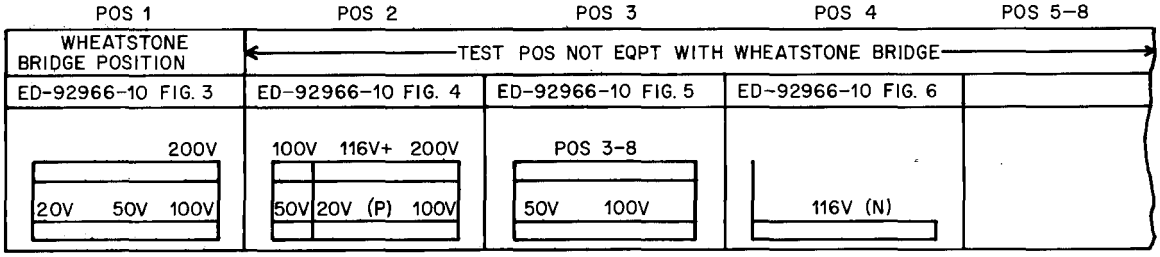
If the Electronic Voltmeter unit is equipped however, a separate 200V battery (P) with a 116V tap will be required in addition to the WB position battery to supply the electron tube plate potential, and breakdown test unit. If tube type subsets are to be tested and the coin potential is not maintained between 116-120V the 116V tap on the (P) battery and a separate 116V- battery (N) will also be required.

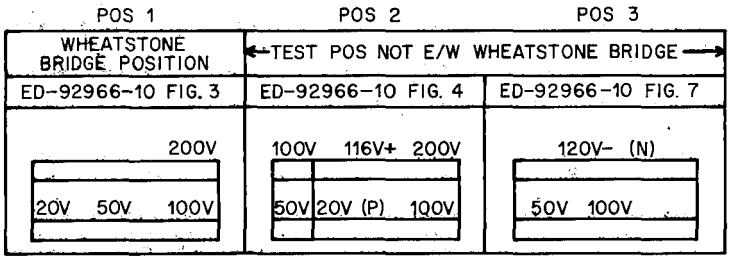
2.508 Dry Battery Data

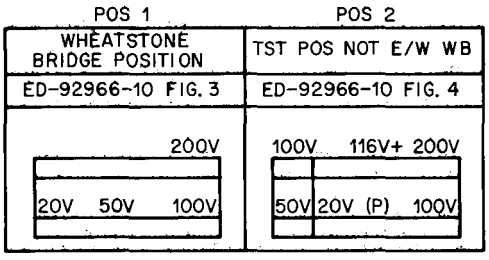
Battery	Dimensions in Inches	Voltage	Taps	Terms
KS-6573	6 13/16 X 4 3/16 X 3 15/16	22 1/2V	(-) (+16½) (+18) (+19½) (+21) (+22½)	Clip Clip
KS-6542	2 5/8 DIA X 6 3/4	1 1/2V	---	Clip
KS14370	3 19/32 X 1 27/32 X 5 1/2	45V	---	Prong Socket
Eveready No. 773	3 7/8 X 3/4 X 3 1/4	7 1/2V	(+) (-1½) (-3) (-4½) (-6) (-7½)	Screw Screw Pigtail

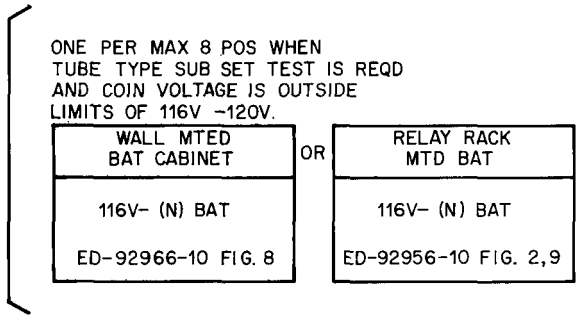
TEST BATTERY ARRANGEMENT IN REAR OF POSITION

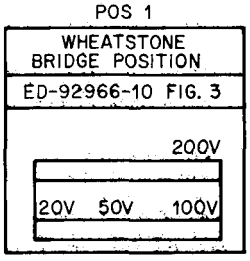
NO. 14 LOCAL TEST DESK J95002H

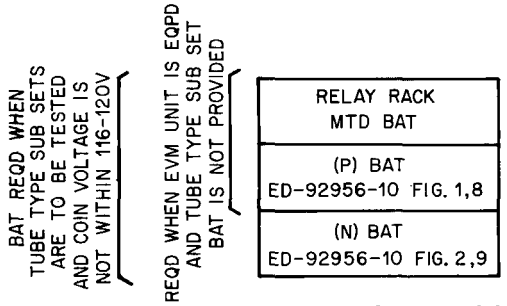


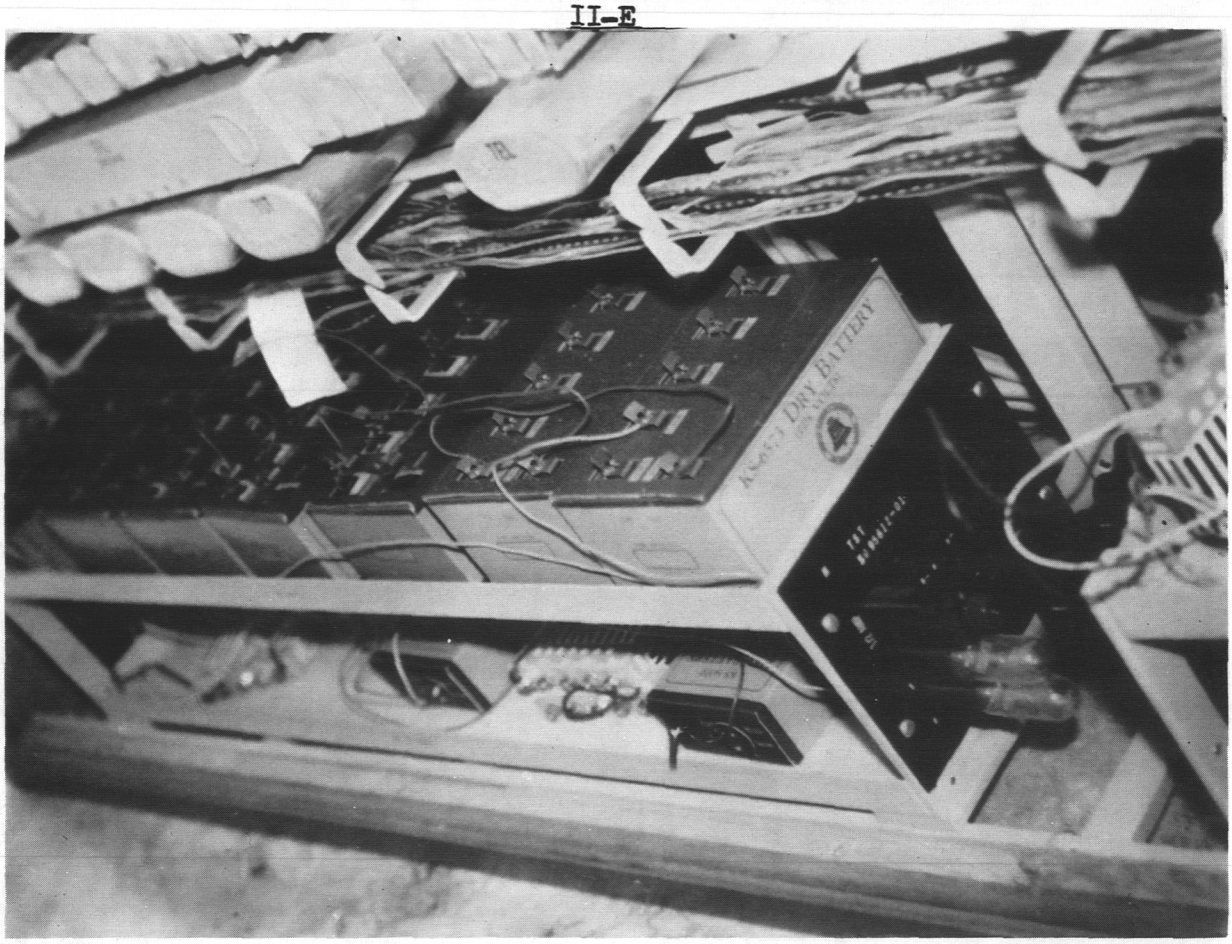




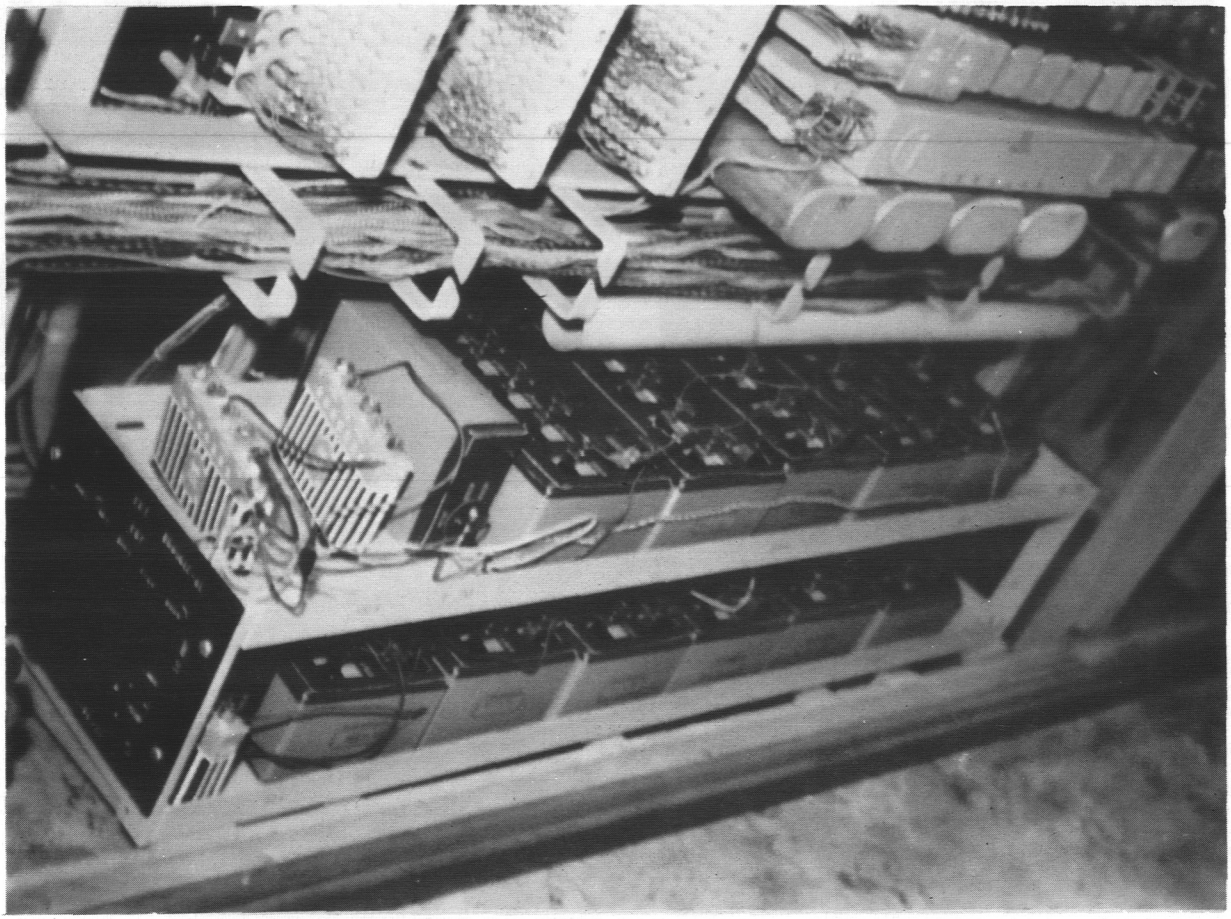




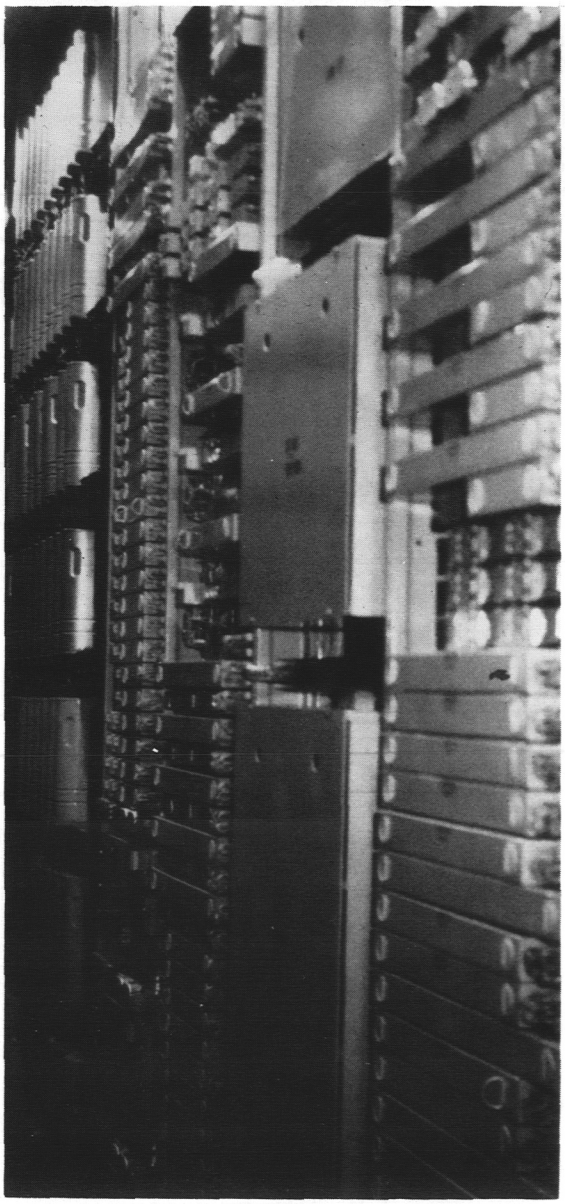

BAT REQD WHEN TUBE TYPE SUB SETS ARE TO BE TESTED AND COIN VOLTAGE IS NOT WITHIN 116-120V
REQD WHEN EVM UNIT IS EQPD AND TUBE TYPE SUB SET BAT IS NOT PROVIDED
RELAY RACK MTD BAT
(P) BAT
ED-92956-10 FIG. 1,8
(N) BAT
ED-92956-10 FIG. 2,9



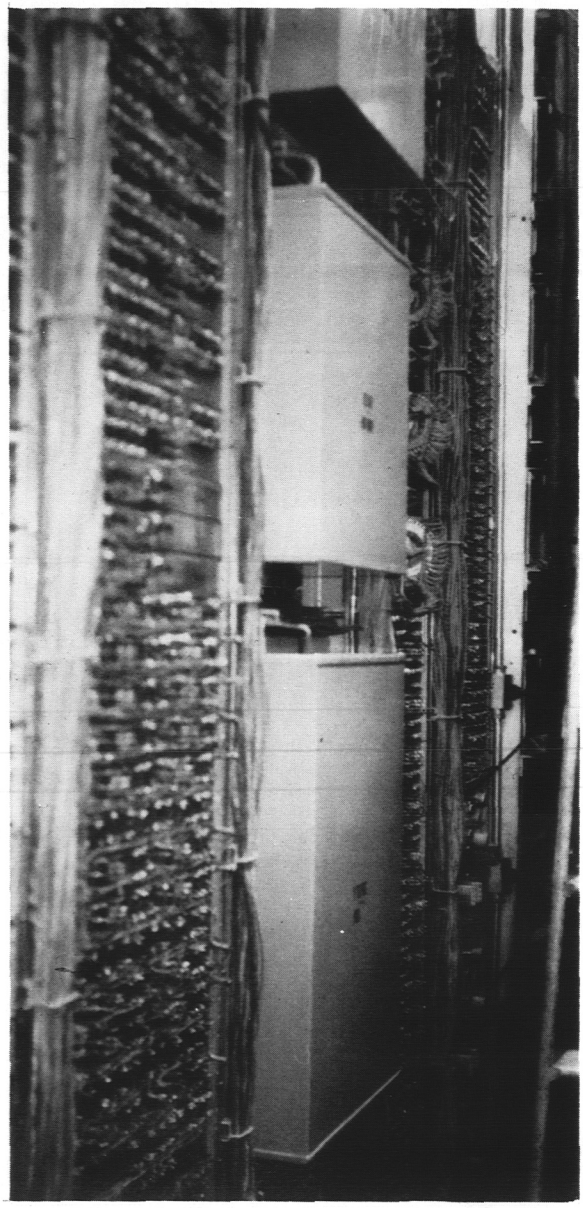
Test Battery Trays in Rear of Position
Lamp Panel End



Test Battery Trays in Rear of Position
Fuse Panel End



Front View of Dry Battery Cabinets



Rear View of Dry Battery Cabinets

TEST CIRCUIT MODIFICATION DATA

MODIFICATION INFORMATION FOR PRIMARY AND SECONDARY TEST CIRCUIT T-90497-( ) TO PROVIDE VARIOUS TEST FEATURES

ITEM	FEATURE	SD-90497-01 ISS	SD-90497-01 FIG	SD-90497-01 OPT	FIGURES AND OPTIONS TO BE MOD. OR DISCONNECTED *J95002	DWG	QUAN	FIG	WRG	APP	FIGURES AND OPTIONS TO BE ADDED OR EQPD. *J95002	DWG	QUAN	FIG	WRG	APP	QUAN PER POS	APPARATUS REQUIRED NOMENCLATURE	WRG IS PROVIDED IN LOCAL CABLE OF	REMARKS
A	KS-13724 VOLT MILLIAMMETER	19 24	(H)	BF BQ	F-1 TO F-7	-12	1	(N)	BE	BE	F-1 TO F-7 F-1 TO F-8	-12 -12	1 1	(N) (N)	BF BQ	BF BQ	1 1 1 2	KS-13724 METER (SEE REMARKS) BRYANT 9445 MINITURE LP HOLDER 59A FUSE (M) P-160398 RHW SCR		MODIFY KS-1366 METER TO KS-13724 METER (SEE SFM 50-A & ENGINEERING HANDBOOK SECTION 3, PAGE 33 NOTE 3). LP HOLDER MOUNTS ON BACK OF METER PANEL (SEE ED-90208-10). J95002F-8 MFR AFTER 9-1-48 AND J95002F-9 ARE EQUIPPED WITH KS-13724 METER.
	ITEM E: FURNISHED		H	BJ	F-1 F-2 TO F-7 F-8	-11 -16 -16	1 1 1	G H H	BE BE BF	BE BE BF	F-1 F-2 TO F-7 F-8	-11 -16 -16	1 1 1	H N N			1 1	A1AAS KEY 101ED RES (1053Ω)(A)(J95002F-1 TO F-7 ONLY)		
	ITEM E: NOT FURNISHED		(H)	BI	F-1 F-2 TO F-7	-11 -16	1 1	(G) (H)	BE BE	BE BE	F-1 F-2 TO F-7	-11 -16	1 1	(G) (H)	BF BF	BF BF	1 1	A1AAG KEY 101ED RES (1053Ω)(A)		
B	S9A VOLT MILLIAMMETER	21	J	BQ	F-1 F-1 TO F-7 F-8 MFR BEFORE 9-1-48 F-2 TO F-8	-11 -12 -12 -16	1 1 1 1	G N N H	BE OR BF BE BF BE OR BF	BE OR BF BE BF BE OR BF	F-1 TO F-7 F-8 MFR BEFORE 9-1-48	-18	1	JJ OR J (SEE RMKS)	BQ	BQ	1 1 1 7 1 3 1 1 2	A1AAS KEY (FIG. JJ ONLY)(SEE REMARKS) S9A VOLT MILLIAMMETER ED-92227-70 G-1 METER MTG ASSEM P-5738 TERM PCHG 101G JK SPACE 101AL JK SPACE 9445 ARROW-HART & HEGEMAN MINIATURE BASE CLEAT RECEPTACLE — REUSE IF "BP" OR "BQ" OPT IS ALREADY PROVIDED (J95002F-8) 59A FUSE (M) P-142036 RHM SCR	J95002F-10 & F-11	THIS FEATURE IS EQUIPPED IN BASIC LIST FOR J95002F-10 & F-11. FIG. JJ & BQ OPTION IS REQUIRED WHEN TEST FEATURE (T-90497-19 FIG. L) (ITEM E) IS PROVIDED. WHEN ITEM E IS NOT FURNISHED SPECIFY T-90497-18 FIG. J IN PLACE OF FIG. JJ & BQ OPTION.
					F-8 MFR AFTER 9-1-48 F-9	-12 -16 -18	1 1 1	P H J	BI BE OR BF BP	BI BE OR BF	F-8 MFR AFTER 9-1-48	-18	1	JJ	BQ	BQ	1 1 1 1	A1AAS KEY BRYANT 9445 MINIATURE LP HOLDER — DISREGARD IF "BP" OR "BQ" OPT IS ALREADY PROVIDED 59A FUSE (M) P-142036 RHM SCR		FIG. JJ IS REQUIRED ONLY WHEN TEST FEATURE (T-90497-19 FIG. L)(ITEM E) IS PROVIDED.
C	PEM 3690 METER TYPE DIAL TESTER (ITEM A OR B MUST BE PROVIDED)	20	K (1)	BH, BQ A	F-1 F-2 TO F-10 F-11 F-1 F-2 TO F-10 F-11 F-8 TO F-11	-14 -17 -24 -14 -17 -24 -18	1 1 1 1 1 1 1	(E) (J) (9) (3) (3) (3) (K)	L OR S L OR S L OR S	L OR S L OR S AA, L OR S	F-1 TO F-11 F-1 F-2 TO F-10 F-11	-18 -14 -17 -24	1 1 1 1	K 3 3 3	BJ, BQ, BZ		1 1 1 1 1 1 1 1 1	ED-92867-18 G-1 & 2 OR 3 (MTD ON RELAY RACK) DIAL TEST UNIT A1AAH KEY U722 REL (DT) U-4 REL COVER 107A RES (57,060Ω)(D) 107B RES (5,360Ω)(C) 107B RES (25,650Ω)(B) ~~R74~~ R591 REL (SW) R-1 REL COVER (J95001F-1 TO F-9 ONLY)	J95002F-8 TO F-11	ADD T-96335-12 FIG 1 & J WITH "R" & "V" OR "Z" WRG AND "R", "T" & "V" OR "Z" APP. FURNISH "BJ" WRG WHEN T-90497-19 FIG L IS USED.
D	PEM 4184 VOLTMETER BRIDGE TEST (WHEATSTONE BRIDGE POS ONLY) (ITEM A OR B MUST BE PROVIDED)	23	(1)		F-1 TO F-8	-12	1	S			F-1 TO F-8	-12	1	R			1 1 1 1 1 1	A1AAJ KEY A1AAK KEY A1AAL KEY A1AAM KEY LC-950-003 G-2 LOCAL CABLE 19LA RES(G) 101ED RES (1053Ω)(H)(SEE REMARKS) — T-90059-12		MODIFY T-90059-11 FIG 1 TO ADD "ZZ" WRG. MODIFY T-90059-11 FIG 2 TO AGREE WITH T-90059-12 FIG 1 & D AND PROVIDE "H" WRG & APP (FIG D) ONLY WHEN KS-13724 METER (ITEM A) IS FURNISHED. THIS FEATURE ALSO PROVIDES WIRING FOR MANUAL OR AUTOMATIC VARLEY 3 TEST T-90059-12 FIG A & B.
					F-9 TO F-10 F-11	-12 -21	1 1	(R) (1)									1	19LA RES(G) T-90059-12	J95002F-9 TO F-11	MODIFY T-90059-12 FIG C TO AGREE WITH FIG D

* SEE GENERAL NOTE 3

TEST CIRCUIT MODIFICATION DATA (CONT)

MODIFICATION INFORMATION FOR PRIMARY AND SECONDARY TEST CIRCUIT T-90497-( ) TO PROVIDE VARIOUS TEST FEATURES

ITEM	FEATURE	SD-90497-01 ISS	FIG	OPT	FIGURES AND OPTIONS TO BE MOD. OR DISCONNECTED ✻J95002	DWG	QUAN	FIG	WRG	APP	FIGURES AND OPTIONS TO BE ADDED OR EQPD ✻J95002	DWG	QUAN	FIG	WRG	APP	QUAN PER POS	APPARATUS REQUIRED NOMENCLATURE		WRG IS PROVIDED IN LOCAL CABLE OF	REMARKS
E	PEL 4782	22 24 25 35		BJ,BZ	F-1 F-1 F-1 F-1 TO F-9 F-1 TO F-9 F-2 TO F-9 F-2 TO F-9 F-2 TO F-9	-11 -11 -11 -12 -12 -16 -16 -16	1 1 1 1 1 1 1 1	(1) J (A OR B) (1) (H OR J) (1) M (A OR B)	BI,BY BI BI BY BI,BY BI	BI B OR C BI B OR C	F-1 F-1 F-1 TO F-9 F-1 TO F-9 F-2 TO F-9 F-2 TO F-9 F-1 TO F-9	-11 -11 -12 -12 -16 -16 -19	1 1 1 1 1 1 1	(1) (A OR B) (1) (H OR J) (1) (A OR B) L	BJ, BZ BJ BJ BZ BJ, BZ BJ BZ	BJ BJ 	1 1 1 1 1 1 1 1 1	A1AAP KEY A1AAT KEY A1AAU KEY N8A TS (FIG H ED-90684-1C OR J95002F-5 & UP) 107A RES (15,000Ω)(AC3) 107A RES (28,000Ω)(AC2) 107A RES (45,300Ω)(AC1) 609DL (64) MTG PLT E/W — SK H-4 F-1 TO F-4, F-6 TO F-8; SK H-2 F-5, F-9		J95002F-10 & F-11	ITEM E IS FURNISHED IN BASIC LIST FOR J95002F-10 & F-11. N8A TS IS ALSO USED FOR MF KEY PULSING FEATURE (ITEM H). "YA" APP (FIG 1) AND "W" APP (FIG G OR H) ON T-90050-14 MUST BE REPLACED WITH ZE APP (FIG 1) AND "F" APP (FIG G OR H) TO CONFORM WITH NEW MTG PLT DRILLING.
	METALLIC VOLTMETER TEST 60 VOLT SCALE AND A-C TEST WITH OR WITHOUT ELECTRONIC VOLTMETER TEST (ITEM A OR B MUST BE PROVIDED)		L	BZ	F-1 F-2 TO F-9 F-2 TO F-9	-14 -17 -18	1 1 1	(F) (K) (K)	BY BY BY		F-1 F-2 TO F-9 F-2 TO F-9	14 -17 -18	1 1 1	(F) (K) (K)	BZ BZ BZ		1 1 1 1 2 2 1 1 1 1 1 1 1 1	181B IND COIL(A) POS 8 — SEE REMKS 202A REP COIL(B) 56 U1323 REL (REV) 251 U-5 REL COVER 251 437A CAP (AC) 280 26A T.P. 289R P-251072 RHM SCR MODEL 9956 WESTON COPPER OXIDE RECT (AC) 296R PER WESTON DWG D-89368 188H RES (AC4) 304 208A TERM 304R P-210800 RHM SCR 18CN RES(AC5) 312 18AC RES(AC6) 320 19CN RES(AC7) 328 18T RES (AC8) 336			
	POSITION WITHOUT WHEATSTONE BRIDGE		(2) 11	BJ	F-1 TO F-10	-15	1	(4)	BI		F-1 TO F-9 F-1 TO F-9	-15 -15	1 1	(4) 14	BJ		1 PER 8 POS 1 1	ED-91379-11 G-11 — BAT TRAY & FUSE PANEL E/W — BATTERIES MTD IN REAR OF POSITION G-9 PANEL G-12 (TST) BAT & FUSES			BATTERY EQUIPMENT IN PLACE FOR J95002F-10 & F-11.
																		OR			
																	1 PER 8 POS 1	ED-92956-10 G-7 — BAT CAB & MTG PLT E/W — G-8 (TST) BAT & FUSE — RELAY RACK MTD BATTERIES (SEE REMARKS)			SPECIFY ED-92956-10 G-8 TO OMIT 138 RES LP. INSTALLER SHALL CHANGE STAMPING TO SD-90497-01
	POSITION WITH WHEATSTONE BRIDGE		(3)	BJ	F-1 TO F-10	-15	1	(5)	BI		F-1 TO F-9	-15	1	(5)	BJ	BJ	2 1	5-E FUSE POST 24E FUSE 1/2 AMP (S2A)			FUSE IN PLACE FOR J95002F-10 & F-11.
	ITEM A OR B MUST BE PROVIDED — WITH ITEM A		(L)	BF							F-1 TO F-8	-19	1	(L)	BF	BF	1	107A RES (30,000Ω)(VS)			
	WITH ITEM B		(L)	BN							F-1 TO F-11	-19	1	(L)	BN						
	ELECTRONIC VOLTMETER — NOT REQD	25	(L)	BR							F-1 TO F-11	-19	1	(L)	BR						
	REQD	24 34 35	(L) (1) (2),9	AT AH,BJ BJ	F-1 TO F-11	-19	1	(L)	AS		F-1 TO F-11 F-1 TO F-10 F-11 F-10 F-10 F-10 & F-11 F-10 F-10 F-11 F-11	-19 -16 -26 -12 -16 -19 -17 -18 -21 -23	1 1 1 1 1 1 1 1 1 1	(L) P OR Q 6 (H OR J) (1) (L) (K) (K) (I) (I)	AT AH OR BJ BZ BZ BZ BZ BZ BZ BZ	AT AH OR BJ 	1 1 1 1 2 1 1 2 2 1 1 1	J93016K-1 L-1 & A EVM TST UNIT (MTD ON RELAY RACK) 609DL (70) MTG PLT E/W — F-1 TO F-4 SK G-3; F-5 TO F-10 SK G-1 U1323 REL (ELV) POS 263 U-5 REL COVER 263 5-E FUSE POST — DISREGARD IF "AH" OPT 24E FUSE 1/2 AMP (S3) — IS ALREADY PROVIDED. R1356 REL (PO) T-90050-14 (J95002 F-1 TO F-3, F-7 TO F-10) R-1 REL COVER (J95002F-1 TO F-3, F-7 TO F-9) P-88738 BUSHING (J95002F-1) P-294115 BUSHING (J95002F-11) U1323 REL (ELV) — J95002F-11 U-5 REL COVER — SK H SEE REMARKS 13L RES LP (PL) T-95596-11			ADD T-95596-11 FIG. 1 WITH "T&Y" WRG, FIG 2 AND FIG A OR B WITH "W" OR "X" APP. ADD T-90050-14 FIG. P (J-95002F-2 TO F-10). MODIFY T-90050-12 FIG. E OR F TO AGREE WITH FIG. K OR L (J-95002F-1) INSTALLER TO DRILL FOR R1356 REL PER A-112450 FIG. 5A (ED-90684-10 SK. D POS. 12) MODIFY T-90050-14 FIG. K WITH "M" APP TO AGREE WITH FIG. L WITH "M" APP (J-95002F-2 & 3). ADD T-90050-14 "M" APP (FIG. L) (J-95002F-7 TO F-10). "AT" OPT REQD TO PREVENT INDUCTIVE DISTURBANCE IN THE EVM CKT WHEN RELAY RACK IS LOCATED AT A DISTANCE FROM THE LOCAL TEST DESK. "AH" WRG & APP IS FURNISHED WHEN TESTING TUBE TYPE SUB SETS IS REQD, OTHERWISE "BJ" WRG & APP IS SPECD. "BZ" WRG IS A CLASS D IMPROVEMENT TO PREVENT INTERFERENCE FROM (RCC1) KEY WHILE THE (ELVM) KEY IS OPERATED. INSTALLER TO DRILL FOR U-1323 REL PER A-750390 FIG. 29 (J95002F-11 SK H POS 160).
F	DIALING OVER TEST CORD	3	(B) (1) 8 (8) (1) 8 (8)	BO B,C,D BL BO B,C,D BL OR BK	F-1 F-1 F-1 F-1 F-2 TO F-10 F-2 TO F-10 F-2 TO F-10	-11 -11 -14 -14 -16 -17 -17	1 1 1 1 1 1 1	C (K) (4) A,B OR C (J) (4) (R)			F-1 F-1 F-1 F-1 F-2 TO F-10 F-2 TO F-10 F-2 TO F-10	-11 -11 -14 -14 -16 -17 -17	1 1 1 1 1 1 1	D K OR L 4 D J OR K 4 R OR S	B BO OR BM (FIG. K) B	B OR C,L BL B OR C,D B OR C,D	2 2 1 4 OR 5 1 1 1 1	~~R74~~ R591 REL (PD-1), (SD-1) ~~R74~~ R591 REL (PD), (SD) ("B" APP) — SEE REMARKS OR R608 REL ("C" APP) ~~R1279~~ R488 REL (PR) - SEE REMARKS R-1 REL COVER 18BF RES (AZ) 18BH RES (BF) ("D" APP) - SEE REMARKS 19H RES (BA) A1YR KEY OR A1AAN KEY	J95002F-1 TO F-11	(PR) ~~R1279~~ R488 REL T-90497-14 (FIG D) OR -17 (FIG. 4) "S" APP IS REQD FOR TESTING SXS OFFICES. WHEN CONNECTION TO NO. 1 CROSSBAR INCOMING TRUNKS WHICH HAVE ACCESS TO EXTRA NUMBERS NOT IN THE REGULAR SUBSCRIBER SERIES IS REQUIRED, SPECIFY "B" WRG & APP AND "D" APP ON T-90497-14 OR -17 (FIG. 4) AND PROVIDE "B" WRG & APP (A1AAA KEY). IN PLACE OF "C" APP ON T-90497-11 (FIG. J) OR -16 (FIG. M) ONLY WHEN T-90497-19 FIG. L (ITEM E) IS NOT PROVIDED. WHEN MF KEY PULSING IS REQUIRED SPECIFY A1AAN KEY T-90497-14. (FIG. D) "BK" APP OR -17 FIG. S AS INDICATED IN ITEM H. DIALING EQUIPMENT PER T-90050-12 FIG. 4 WITH "B" WRG (J95002F-1), T-90050-14 FIG. 4 WITH "B" WRG (J95002F-2 TO F-10) AND T-90050-15 FIG. 4 (J95002F-11) MUST ALSO BE PROVIDE IF NOT ALREADY IN PLACE. - SEE T DWG FOR APPARATUS REQUIRED. "B" WRG ON T-90050-12 & -14 FIG. 4 IS REQUIRED FOR ACCESS TO EXTRA NUMBERS.

✻ SEE GENERAL NOTE 3

TEST CIRCUIT MODIFICATION DATA (CONT)

MODIFICATION INFORMATION FOR PRIMARY AND SECONDARY TEST CIRCUIT T-90497- ( ) TO PROVIDE VARIOUS TEST FEATURES

ITEM	FEATURE	SD-90497-01 ISS	FIG	OPT	FIGURES AND OPTIONS TO BE MOD. OR DISCONNECTED *J95002	DWG	QUAN	FIG	WRG	APP	FIGURES AND OPTIONS TO BE ADDED OR EQPD *J95002	DWG	QUAN	FIG	WRG	APP	QUAN PER POS	APPARATUS REQUIRED NOMENCLATURE	WRG IS PROVIDED IN LOCAL CABLE OF	REMARKS
G	DIALING ON SUBSCRIBER'S LINES (REQD FOR SXS & X-BAR NO 1 OR NO 5 OFFICES) (SIMULATES SUBCRIBER DIALING)	13	10		F-1	-11	1	(1)	ZD	H OR J	F-1	-11	1	(1)	AM	ZZ	1	R1060 REL (DL1)	J95002F-6 TO F-11	INSTALLER TO DRILL FOR R1060 & R1901 REL PER A112450 (ED-90684-10 & J95002F-5 SK C POS 9 & 10). A1ABB KEY IS COMMON TO THE COIN TRUNK TEST FEATURE (ITEM K).
											F-1	-14	1	11			1	R1901 REL (DL)		
					F-2 TO F-10	-16	1	(1)	ZD	J	F-2 TO F-10	-16	1	(1)	AM	ZZ	2	R-1 REL COVER		
					F-6 TO F-10	-17	1	(10)			F-2 TO F-10	-17	1	10			1	A1ABB KEY		
																	2	P-88738 BUSHING (J95002F-1 TO F-5 ONLY)		
																	2	P-284188 WASHER		
					F-11	-23	1	(1)	AP		F-11	-24	1	10			1	R1060 REL (DL1)		
						-24	1	(10)									1	R1901 REL (DL)		
											F-1									MODIFY T-90050-12 FIG 1 TO DISCONNECT "N" WRG AND ADD "Q" WRG
											F-2 TO F-10									MODIFY T-90050-14 FIG 1 TO DISCONNECT "N" WRG AND ADD "Q" WRG J95002F-2 TO F-5, CONNECT "Q" WRG J95002F-6 TO F-10.
											F-11									MODIFY T-90050-15 FIG 1 TO DISCONNECT "N" WRG AND CONNECT "Q" WRG.
H	PEL 4782	22	(1)	BM	F-1	-11	1	K		BL(FIG.D)	F-1	-11	1	L		BK	1	J93016J-2 L-1 MF KEYSET UNIT (MOUNTS ON RELAY RACK) — FOR MF PULSING ONLY (2/6 SIGNALING)	J95002F-10 & F-11	ADD T-95570-12 FIG.1 (J93016J-2). ADD T-95570-11 FIG.2 & C (J95002F-1 TO F-11) — FOR MF (2/6) PULSING ONLY.
			(8)	BK	F-1	-14	1	C OR D			F-1	-14	1	D			1	499H KEY E/W		ADD T-95570-13 FIG. 3 (J93016CC-1) — FOR MF KEYSET ARRANGED FOR
			(1)	BM	F-2 TO F-9	-16	1	J			F-2 TO F-10	-16	1	K	BM		1	M7C CORD — T-95570-11		ADD T-95570-13 FIG.4 (J95002F-1 TO F-11) — BOTH MF (2/6) AND TOUCH-TONE
					F-10	-16	1	(K)	BO								1	34A CONN BLOCK		ADD T-99328-30 FIG.1 WITH "Y" APP — 4X4 PULSING.
					F-2 TO F-9	-17	1	R			F-2 TO F-10	-17	1	S			1	J93016CC-1 L-1 MF KEYSET UNIT (MOUNTS ON RELAY RACK) — FOR MF & TOUCH-TONE PULSING (2/6 & 4X4 SIGNALING)		INSTALLER TO DRILL AND TAP .138-32 HOLES IN FRAMEWORK ANGLE IRON FOR 34A OR 34B CONN BLOCK-LOCATION SHOWN ON ED-90208-10 FIG.V OR W. N8A TS IS ALSO USED FOR METALLIC VOLTMETER TEST FEATURE (ITEM E). INSTALLER TO DRILL PLUG SHELF FOR 49A LAMP SOCKET PER A-318669 AND FOR 12B NO. PLATE PER A-104333 (J95002F-1 TO F-9).
					F-10	-17	1	(S)									1	499J KEY E/W		
					F-11	-23	1	(1)	BO		F-11	-23	1	(1)	BM		1	M13A CORD — T-95570-13		
																	1	34B CONN BLOCK		
																		SEE ITEM N FOR TOUCH TONE TESTING		
																	1	J99235BK-1 L-1 SIG GEN UNIT E/W (MOUNTS ON RELAY RACK)		
																	1	L-4		
																	1	49A LAMP SOCKET		
																	1	2C LAMP — T-95570-11 OR -13		
																	1	2AY LAMP CAP		
																	1	12B NO. PLATE ENGR S		
																	1	P-32A699 BLOCK		
																	2	P-130826 FHW SCR		
																	2	P-160747 FHW SCR		
																	2	P-124483 RHM SCR		
																	1	A1AAN KEY (J95002F-1 TO F-10 ONLY)		
																	1	N8A TERM STRIP (F-1 TO F-9 ONLY) (FIG.H ED-90684-10 AND J95002F-5 & UP)		
											F-1 TO F-9						1	H-502-142 G-6		MODIFICATION OF PLUGSHELF ASSEMBLY FOR MFKP IN POSITION EQUIPPED WITH KS-8263 CLOCK.
																	1	H-502-142 G-8		MODIFICATION OF PLUGSHELF ASSEMBLY FOR MFKP IN POSITION EQUIPPED WITH KS-14156 CLOCK.
	IF POSITION IS E/W SUBSCRIBER SET RELAY TEST		(1)	BK	F-1	-11	1	(1)		BL	F-1	-11	1	(1)		BK	1	A1AAR KEY		
					F-1	-14	1	A OR B			F-1	-14	1	G						
					F-2 TO F-9	-16	1	(1)		BL	F-2 TO F-9	-16	1	(1)		BK				
					F-2 TO F-9	-17	1	A OR B			F-2 TO F-9	-17	1	P						
J	PEM 4933 CONDUCTOR IDENTIFICATION TONE	28	(1)	BW	F-1	-11	1	(1)		BV	F-1	-11	1	(1)	BW	BW	1	A1ABC KEY	J95002F-11	INSTALLER TO REDRILL FOR B TYPE REL PER A-141511 (ED-90684-10 SK A OR A-1 OR J95002F-5 TO F-10 SK A POS 9). WHEN SD-90497-01 IS USED IN A LINE UP WITH ANY POSITION WIRED PER SD-90053-01 SPECIFY T-90497-13 FIG H FOR J95002F-1 TO F-10 AND PROVIDE CONTINUOUS OPERATION ON T-95689-11.
			(1)	BW	F-1 TO F-10	-13	1	E		BV	F-1 TO F-10	-13	1	F	BW	BW	1	18BH RES (SR1)		
					F-2 TO F-10	-16	1	(1)		BV	F-2 TO F-10	-16	1	(1)	BW	BW	1	441A CAP (TT)		
																	1	B1058 REL (SR2)		
																	2	P-296808 BUSHING		
			(1)	AG	F-11	-22	1	A OR C			F-11	-22	1	B			1	441A CAP (TT)		
K	PEM 5126 COIN TRUNK TEST (FOR SXS OFFICES)	26	(10)	AM,ZZ	F-1	-11	1	(1)	ZC, H OR J	ZC, H OR J	F-1	-11	1	(1)	AM	ZZ	1	A1ABB KEY	J95002F-11	A1ABB KEY IS COMMON TO THE DIALING ON SUBSCRIBERS LINE FEATURE (ITEM G). COIN TRUNK TEST IS PROVIDED IN BASIC LIST FOR J95002F-11.
					F-2 TO F-10	-16	1	(1)	ZC	ZC OR ZY	F-2 TO F-10	-16	1	(1)	AM	ZZ				

* SEE GENERAL NOTE 3

TEST CIRCUIT MODIFICATION DATA (CONT)

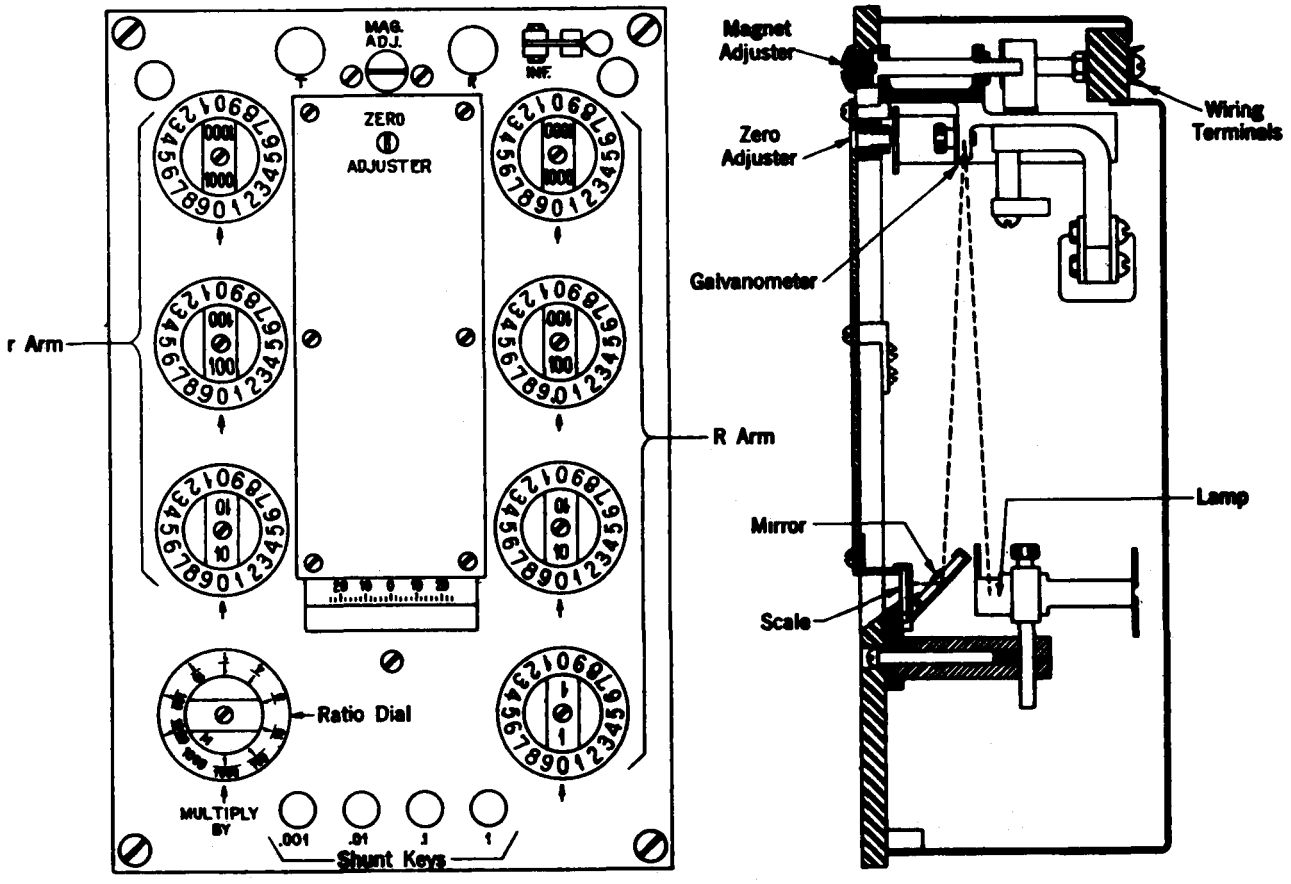
MODIFICATION INFORMATION FOR PRIMARY AND SECONDARY TEST CIRCUIT T-90497-( ) TO PROVIDE VARIOUS TEST FEATURES

ITEM	FEATURE	SD-90497-01 ISS	FIG	OPT	FIGURES AND OPTIONS TO BE MOD. OR DISCONNECTED *J95002	DWG	QUAN	FIG	WRG	APP	FIGURES AND OPTIONS TO BE ADDED OR EQPD. *J95002	DWG	QUAN	FIG	WRG	APP	QUAN PER POS	APPARATUS REQUIRED NOMENCLATURE	WRG IS PROVIDED IN LOCAL CABLE OF	REMARKS
L	PEM 5152 DISTANCE OFFICE TESTING (CENTRALIZED OR OFF PREMISE TESTING - 1500Ω TRUNK LOOP)	30 32	(1) N P (1) (1) (1) (1) P 1 G1 GIORG3 G1 GIORG3	AG R,AG AG AG R,AD, AF (R)	F-1 F-1 TO F-10 F-1 TO F-10 F-1 TO F-10 F-1 TO F-3

3. Wheatstone Bridge Circuits

Wheatstone bridge testing facilities are available in the local test desk for use primarily for locating cable faults. This feature is provided only when specified by the Telephone Company, usually only in one or two positions of a lineup which are assigned to cable testing.

These facilities consist of a Wheatstone Bridge Cord circuit and several Wheatstone Bridge Test Trunk circuits.



Views of Wheatstone Bridge KS-3011

3.1 Wheatstone Bridge Test Cord Circuit

This circuit contains a KS-3011 Wheatstone bridge, two cords and four A1 type keys located in the keyshelf and relay

equipment located in the rear equipment. The position wiring is contained in a supplementary local cable which is superimposed on the main local cable and terminated on terminal strips in the rear of the position.

The following Wheatstone bridge test cord circuits are in use:

WB Test Ckt	Rating	Used On	Lamp Voltage	Assoc Tst Cord
SD90059-01	MD	J95002-A,B	(24V)	SD90053-01
		J95002-F,G	(24V)	SD90497-01
SD95769-01	STD	J95002-H,K	(*24V or 48V)	SD95612-01

* For addition to lineup with 24V option.

The following optional features are available in the Wheatstone bridge cord circuit:

3.101 Open Location Test This feature is furnished only when specified by the Telephone Company and requires an (OL) lamp located in the piling rail of the first panel of the desk and a 4-cycle interrupter (relay rack mounted).

3.102 The 4-Cycle Interrupter is a motor driven rotary reversing switch with associated control relays. Two vintages are in use:

SD95301-01 (24V) used with WB Cord Circuit SD90059-01, or SD95769-01.

SD95778-01 (48V) used with WB Cord Circuit SD95769-01 only.

3.103 Automatic Varley 3 Test (PEM 4184)

The Varley 3 test is part of the basic Wheatstone bridge cord circuit and requires the connection of battery to the bad pair at the MDF. Prior to 1950, this was done manually. In 1950, the Automatic Varley 3 Test feature was introduced.

It consists of additional relay and key equipment which connects a ringing pulse to the TG and RG leads causing the Central Office Trunk to bridge the TB and RB leads and connect battery automatically to the bad pair at the MDF. the connecting circuits at the MDF are as follows:

SD90403-01 for Manual Varley 3 Testing

SD95545-01 for Automatic Varley 3 Testing

Additional information regarding these circuits is shown under "Associated Central Office Circuits." SD95545-01 is furnished in the No. 5 Crossbar package office. Test desks serving these offices should be arranged for Automatic Varley 3 testing since these offices are generally unattended. The Automatic Varley 3 test is provided on an optional basis in positions made from J95002F-9 or later. Local test desks equipped for Automatic Varley testing will also function with MDF and SD90403-01 on a manual basis.

3.104 Voltmeter Bridge Test (PEM 4184) (7-26-50)

This test consists of two 300 ohm resistors which form the arms of a bridge in conjunction with the (VMB) voltmeter bridge key and (VMS) voltmeter sensitivity key, using the position voltmilliammeter as a galvanometer. It is used to obtain a rapid check of the correct connections of the test circuit tip and ring conductors with respect to the good and bad pairs at the distant end. This feature was added as an option on Wheatstone bridge cord circuit SD90059-01 in 1950 and requires a (1.2 ma) terminal on the position volt-milliammeter. The KS-1366 meter does not have this connection

and if provided must be modified to a KS-13724 meter, or replaced by the S9A meter.

The voltmeter bridge feature is equipped as part of the basic Wheatstone bridge circuit SD95769-01 in positions made from J95002H-1 and is provided as an option in positions made from J95002F-9 to -11. The Automatic Varley 3 Test and voltmeter bridge test may be added in positions made from J95002A, B, F or G by adding local cable LC-950-002, G2 (which includes all of the wiring shown on T90059-12) and equipping the necessary apparatus.

3.2 Wheatstone Bridge Test Trunks (Desk End)

The Wheatstone Bridge test trunk consists of two jacks (good and bad pair) and a lamp located in the face equipment of the Wheatstone bridge position together with a relay rack mounted unit cabled to the distributing frame for cross-connection to the MDF end.

3.201 Separate Jacks vs Regular Test Jacks for Wheatstone Bridge Test Trunks

Normally separate jacks are provided in fully equipped strips of 10 circuits for Wheatstone bridge test trunks. However, when only one or two Wheatstone bridge test trunks are required, the jacks and lamp circuits of two regular test trunks may be used for each Wheatstone bridge test trunk, if desired.

3.202 Sleeve Resistance (PEM 4184)

Wheatstone bridge cord circuit SD90059-01 and Wheatstone bridge trunk circuit SD90510-01 (Mfr Disc) were originally designed with a sleeve resistance which differed from that of the regular test trunk circuits. In 1949, options were added in these circuits to provide a sleeve resistance equivalent to that of the regular test trunks. Wheatstone bridge cord circuit SD95769-01 and Wheatstone bridge trunk circuit SD95765-01, furnished in J95002H, provide only the latest sleeve condition. Since SD95765-01 is standard for new work, this should be borne in mind when adding this test trunk in older positions.

4. Primary Ringing Circuit

The primary ringing circuit provides a means of ringing a subscriber line over the primary cord circuit with continuous ringing current controlled manually. Operation of the primary ringing key connects ringing current directly to the subscriber line. It is not arranged to operate the test trunk ringing circuit.

Two vintages of primary ringing circuits are in use:

SD90060-01 (MFR DISC)	Used with Cord Circuit SD90053-01
SD90428-01 (STD)	Used with SD90497-01 and SD95612-01

5. Secondary Ringing Circuit

The secondary ringing circuit provides a means of ringing a subscriber line over the secondary cord, usually with tripping relay controlled machine ringing current and is arranged to control the test trunk ringing circuit when provided. Operation of the secondary ringing keys selects the type or ringing to suit the particular subscriber line. Ten party lines are always rung manually from the test desk.

Three series of secondary ringing circuits are in use as shown in the table on the following page.

The secondary ringing circuit must correspond with the test cord circuit of the position to which it connects as shown, i.e. Sec. ringing circuit SD95741-01 is not compatible with test cord circuit SD90497-01 nor is secondary ringing circuit SD90429-01 compatible with cord circuit SD90053-01, etc.

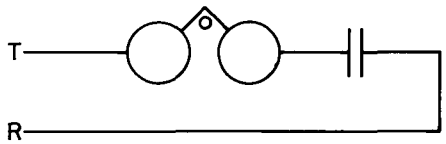
5.1 SECONDARY RINGING CIRCUITS

CIRCUIT	TYPE OF LINE												(RAV) Key for Rel Type Sub Sets	Control of Test Trunk Ringing	TYPE OF RINGING IN DESK OFFICE
	Ind & 2P Sel		4P SS		4P Sel		8P SS		Divided Code (10 Party)		Operation of Test Trk Ringing Ckt				
	Ringing From Desk														
	Man	Mach	Man	Mach	Man	Mach	Man	Mach	Man		Man	Mach			
Sec. Ringing Circuit for use with Test Ckt SD-95612-01 (J95002H)															
SD-95741-01		X		X		X		X	X			X		X	Any Type
Sec. Ringing Circuit for use with Test Ckt SD-90497-01 (J95002F,G)															
SD-90429-01	X		X		*		*				X				Ind & 2P Contin Ring
-02		X							X						SS
-03		X		X		*		*	X			X			SS
-04		X				X	*		X		*		Opt		FS
-05		X		X		X		X	X			X	Opt		FS
-06		X				X		X	X			X	Opt		FS
-07	X				X						X				Man Contin Ring
Sec. Ringing Ckt for use with Test Ckt SD-90053-01 (J95002A,B)															
SD-90061-01															
-02		X										X			Ind & 2P
-03		X		X		*		*	X			X			SS
-04		X				X	X		X			X	Opt	X	FS
-05		X		X		X		X	X			X	X	X	FS
-06		X				X			X			X		NO	2P

* For ringing 4P Full Sel or 8P SS Lines in a distant office.

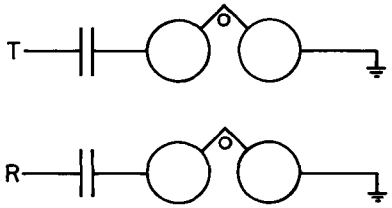
NOTE When furnishing Sec Ringing Ckt for a reused pos the Sec Ringing Ckt should correspond with the Test Cord Ckt to which it connects as shown above.

SINGLE PARTY LINES



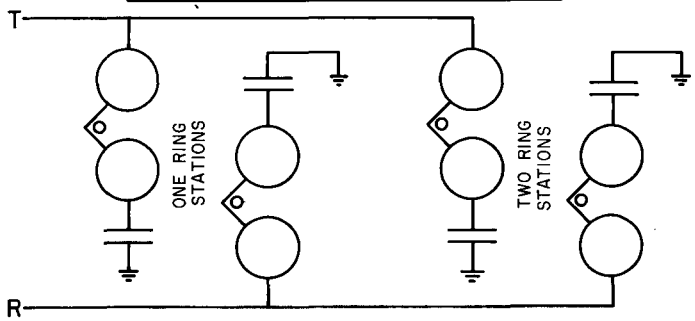
RING APPLIED BY SEC RINGING CKT T	R
MACH RING	R-GRD

TWO PARTY LINES



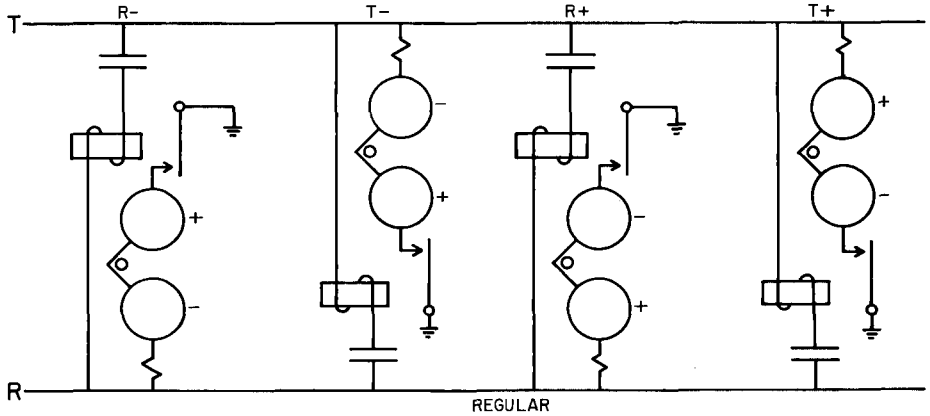
MACH RING	R-GRD
R-GRD	MACH RING

4 PARTY SEMI SELECTIVE LINES



AC–DC R1	R-GRD
AC–DC R2	R-GRD
R-GRD	AC–DC R1
R-GRD	AC–DC R2

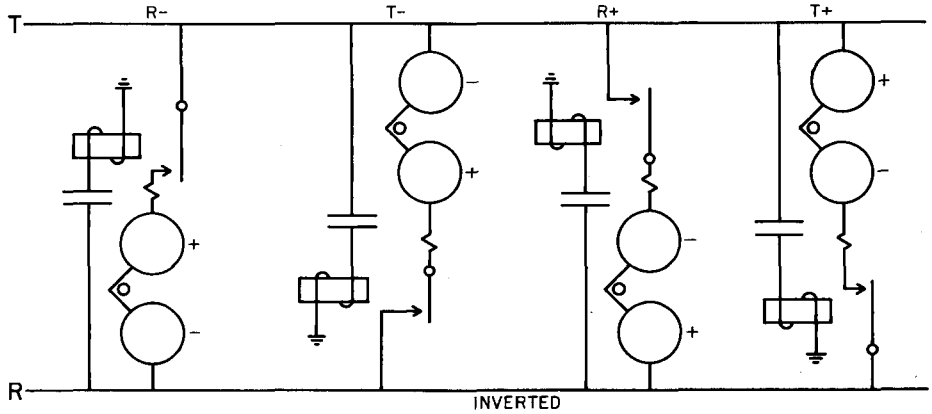
4 PARTY FULL SELECTIVE LINES–RELAY TYPE SUBSETS–(A&M ONLY)



REGULAR

4 RELAYS OPERATE, 2 OPPOSITELY BIASED RINGERS ENERGIZED, ONE RINGS

R-GRD	SUP-R1
SUP-R1	R-GRD
R-GRD	SUP+R1
SUP+R1	R-GRD

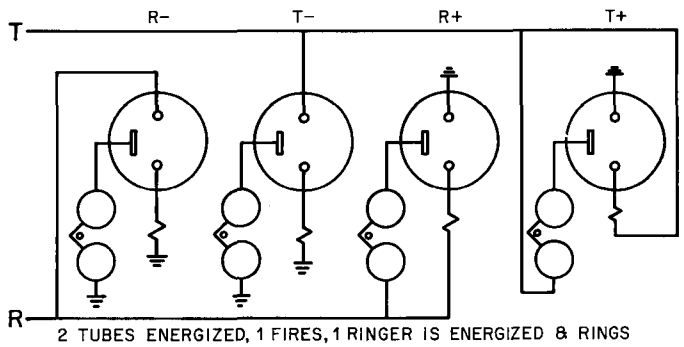


INVERTED

2 RELAYS OPERATE, 2 OPPOSITELY BIASED RINGERS ENERGIZED, ONE RINGS

R-GRD	SUP-R1
SUP-R1	R-GRD
R-GRD	SUP+R1
SUP+R1	R-GRD

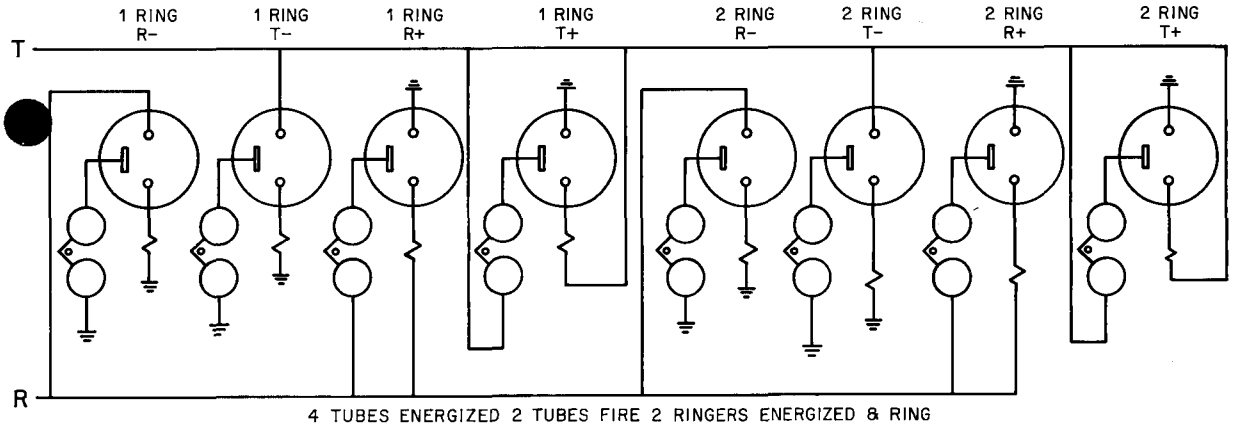
4 PARTY FULL SELECTIVE LINES-TUBE TYPE SUBSETS



2 TUBES ENERGIZED, 1 FIRES, 1 RINGER IS ENERGIZED & RINGS

RINGING APPLIED BY SEC RINGING CKT	
T	R
R-GRD	SUP-R1
SUP-R1	R-GRD
R-GRD	SUP+R1
SUP+R1	R-GRD

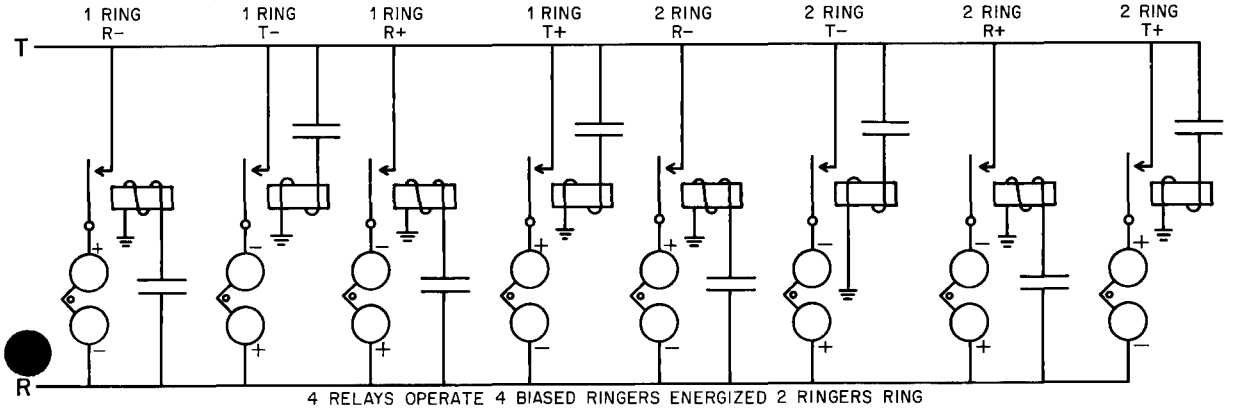
8 PARTY SEMI SELECTIVE LINES-TUBE TYPE SUBSETS



4 TUBES ENERGIZED 2 TUBES FIRE 2 RINGERS ENERGIZED & RING

R-GRD	SUP-R1
SUP-R1	R-GRD
R-GRD	SUP+R1
SUP+R1	R-GRD
R-GRD	SUP-R2
SUP-R2	R-GRD
R-GRD	SUP+R2
SUP+R2	R-GRD

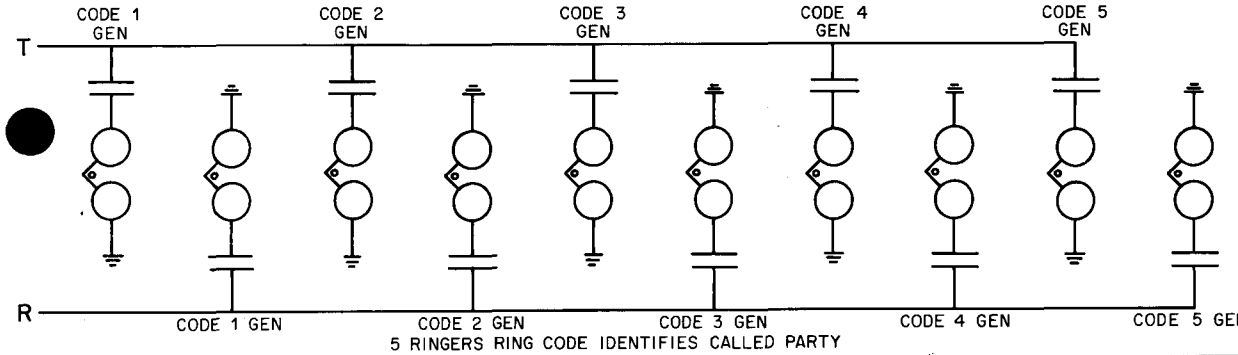
8 PARTY SEMI SELECTIVE LINES-RELAY TYPE SUBSETS (A&M ONLY)



4 RELAYS OPERATE 4 BIASED RINGERS ENERGIZED 2 RINGERS RING

R-GRD	SUP-R1
SUP-R1	R-GRD
R-GRD	SUP+R1
SUP+R1	R-GRD
R-GRD	SUP-R2
SUP-R2	R-GRD
R-GRD	SUP+R2
SUP+R2	R-GRD

10 PARTY DIVIDED CODE LINES-MANUAL RINGING



5 RINGERS RING CODE IDENTIFIES CALLED PARTY

CODE 1 GEN	R-GRD
CODE 2 GEN	R-GRD
CODE 3 GEN	R-GRD
CODE 4 GEN	R-GRD
CODE 5 GEN	R-GRD
R-GRD	CODE 1 GEN
R-GRD	CODE 2 GEN
R-GRD	CODE 3 GEN
R-GRD	CODE 4 GEN
R-GRD	CODE 5 GEN

CODES RUNG MANUALLY FROM LTD

RINGING CURRENT DESIGNATIONS	
OTHER THAN NO. 5 XB	NO. 5 XB EQUIVALENT
AC-DC R1 OR SUP-R1 SUP + R1 AC-DC R2 OR MR R2	CODE 1 GEN CODE 1 + CODE 2 GEN

8P-2RING - RUNG MANUALLY OR FROM SUP+ AUD & SUP-AUD INTERRUPTED BY RELAYS IN SEC RING CKT UNDER CONTROL OF "2+" OR "CODE 2 GRD" PULSES.

5.3 Auxiliary Power Ringing Circuit

The auxiliary power ringing circuit is used to provide a source of superimposed ringing current for ringing 4-party full selective or 8-party semi-selective lines in a distant office when superimposed ringing current is not available in the desk office. It consists of 42-46V+ and 42-46V- battery (composed of No. 6 dry cells) superimposed on 85V± continuous ringing potential. One circuit will serve a lineup of Local Test Desk.

The following Auxiliary Power Ringing circuits are in use:

SD90063-01	MFR DISC
SD95747-01	STD

These circuits are interchangeable.

6. Telephone Circuit

The telephone circuit provides the talking, dialing, monitoring and ringing facilities for the position. The following telephone circuits are in use in the No. 14 Local Test Desk.

Tel Ckt.	Connecting Tst Ckt	Position Eqpt.
SD90050-01	SD90053-01	J95002A&B Series
	SD90497-01	J95002F&G Series
SD95754-01	SD95612-01	J95002H Series

In addition to monitoring, dialing and talking over the test cord circuit, the telephone circuit also provides the following facilities:

6.1 Trunk Key and Lamp Circuits

This circuit consists of a C3H key having a "normal", "talk" and "hold" position, and a lamp. These circuits are cross-connected to talking trunks and tie lines, etc. at the distributing frame. An incoming call is indicated by a flashing lamp. When the call is answered by the operation of the key to the "talk" position, the trunk is connected to the position telephone circuit and the lamp changes to steady (busy). With the key in the "hold" position, the trunk is disconnected from the telephone circuit and held while the operator is talking on another line. The lamp remains steady (busy).

Twenty-nine of these circuits are located at the top of the first, third and fourth panels of each test position. They are wired in the local cable and may be multipled between positions at the position terminal strips or cabled individually to the distributing frame to be cross-connected or multipled as required.

6.2 Trunk Jack and Lamp Circuits

This circuit performs the same function as the trunk key and lamp circuit except that jacks are provided in place of the keys in order to conserve space. These circuits are furnished in strips of 20 as required and are intended to be used instead of key and lamp circuits in a light load position where jack field space is at a premium. Jack ended talking circuits may also be provided in addition to the 29 key ended talking circuits in a regular test position when additional talking trunks are required. These circuits have a space saving advantage as follows:

10 Key ended talking trunks require a space of 3 5/8 inches
20 Jack ended talking trunks require a space of 1 5/8 inches

6.3 Talking Cords (TC1) (TC2)

These cords are required when jack ended talking trunks are provided. A call is answered or originated by patching the TC1 Cord into a jack ended talking trunk and operating the TC1 Key located in the second panel below the meter. This key performs the same function as a key of the key and lamp circuit. With the TC1 Key in the "hold" position, another call may be originated or answered with the TC2 Cord and Key, while the other call is being held.

6.4 Ringing Key

A ringing key is provided for ringing on ringdown type talking trunks and lines. On the regular test position, the ringing key is located at the top of the jack field in place of the 30th trunk key and lamp circuit. In the supervisory and light load position where key and lamp circuits are not furnished, the ringing key is located in the key mounting with the TC1 and TC2 keys below the meter.

6.5 Code Ringing Lines

Code ringing lines are similar to belt lines between test centers and are used for communication between like circuits located in other test centers. Two strips of 10 92AR Keys are wired in the position local cable and may be equipped for code ringing lines as required. Operation of the key connects the telephone circuit to the line and the desired test center is signalled by ringing a code using the ringing key. A subset may be provided for each line to respond to code ringing from the distant end. When more than one subset is equipped, different toned gongs are provided to distinguish the lines. Since the subsets are stocked with only one type of gong, the additional gongs are shipped separately and changed by the installer.

6.6 Monitoring

Monitoring jacks may be provided in a monitoring position when desired for monitoring on the telephone circuits of other positions. Monitoring taps are provided on the position telephone circuit of other positions to connect to these jacks.

6.7 Outgoing Call Circuits

Call circuits are provided for communication between operators. Operation of a call circuit key in the position connects the telephone circuit directly to the telephone circuit of another desk or switchboard. One key having 12 call circuit key units is provided in the basic position equipment. One additional key with 12 call circuit key units may be provided on an optional basis. Red-orange unengraved key buttons are furnished with these keys. When engraved buttons are

required, the blank buttons are replaced by the installer, with engraved buttons ordered separately. (For size and number of characters see A108:226)

6.8 Incoming Call Circuits

Taps for incoming call circuits from other desks are cabled to the distributing frame for cross-connection to OG call circuits in other desks or switchboards.

6.9 Service Observing

T, R and TR leads are cabled to the distributing frame for connection to the service observing circuit as required.

6.10 Compatibility of Telephone Circuits

SD90050-01 is associated with the 95002A, B, F or G series only

SD95754-01 is associated with positions in the J95002H series

The two circuits will operate satisfactorily in their respective positions in the same lineup.

7. MDF Loud Speaker Circuit

Loud speaker facilities are provided for two-way communication between the local test desk and the main distributing frame, protector frame or combined distributing frame in the same and distant buildings. These facilities consist of the following circuits:

1) At the desk end - Loud speaker trunk circuit SD96472-01
2) At the frame end - Loud speaker telephone circuit SD96471-01

7.1 Desk End

SD96472-01 consists of a key and lamp circuit appearance in the face equipment of each LTD position and a (CT) relay per position and a trunk unit located on the relay rack. Twenty (20) key and lamp circuits are wired in each position local cable and terminated on terminal strips in the rear of the position. These circuits are equipped as required. The trunk circuit is terminated on the MDF for cross-connection to the loud speaker telephone circuit SD96471-01 in the same or distant building. A typical equipment arrangement is shown on ED92916-10.

7.2 Frame End

SD96471-01 consists of a trunk and amplifier unit and a number of station (CT) relays located on the relay rack, and a number of talk back transmitters, lamps and switches located on the distributing frame.

The amplifier chassis contains a 12 watt power amplifier for operating the loud speakers and a built in talk back amplifier with a voice operated relay which mutes the transmitters to prevent feed-back when the loud speakers are operating.

The capacity of the circuit is as follows:

Loud Speakers - 24 at 1/2 watt each

Talking Station - 40 (2 transmitters each)(covers 320 feet of distributing frame) both sides.

Trunk Loop Range to desk - 3000 ohms

The loud speakers are Jensen permanent magnet 8 inch dynamic type having an output adjustable from 1/8 to 4 watts. They are mounted in a drum type housing having a baffle on one side making them partially unidirectional. The loud speakers are provided with a universal mounting bracket and are generally mounted on the superstructure about 15 feet apart in a single row on one side of the distributing frame usually over the vertical side. The transmitter and lamp assemblies are supported from the center vertical upright of the distributing frame and are located at staggered heights eight feet apart. Two adjacent transmitters on the same side of the frame constitute a talking station. The transmitter arms on the vertical side of the MDF are hinged so that they may be folded down to provide access to the gun wrapped terminals of 121 type protectors or 300 and 301 type connectors.

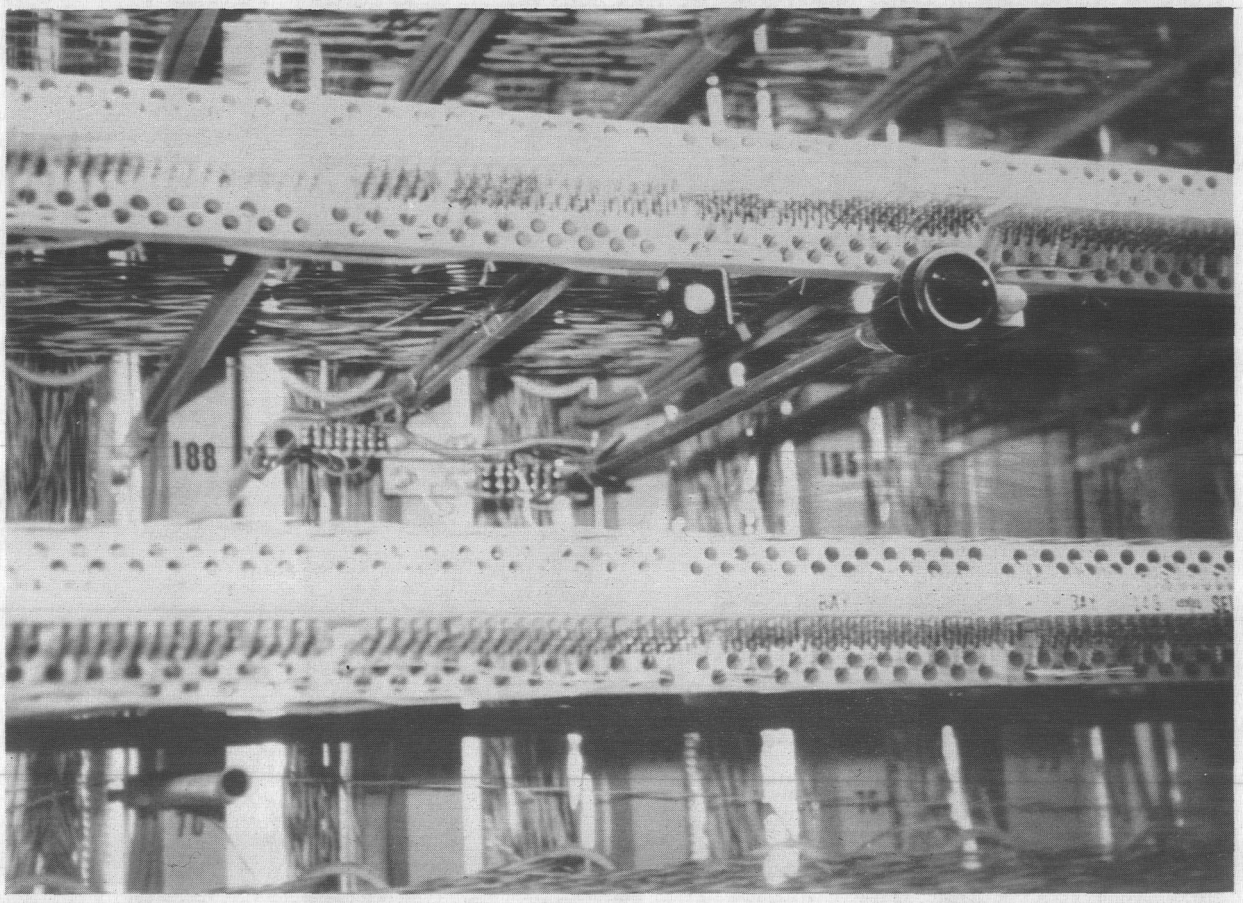
The talking stations are actuated by pull switches operated from a tiller rope and drop cords unless otherwise specified. Push buttons may be furnished instead of pull switches when specified by the Telephone Company or when the lighting fixtures block the use of drop cords.

A typical equipment arrangement is shown on ED92915-10. The circuit is designed for use on MDF's, CDF's and protector frames only. Mounting transmitters on other than these frames is considered "Special" and must be provided on a job basis.

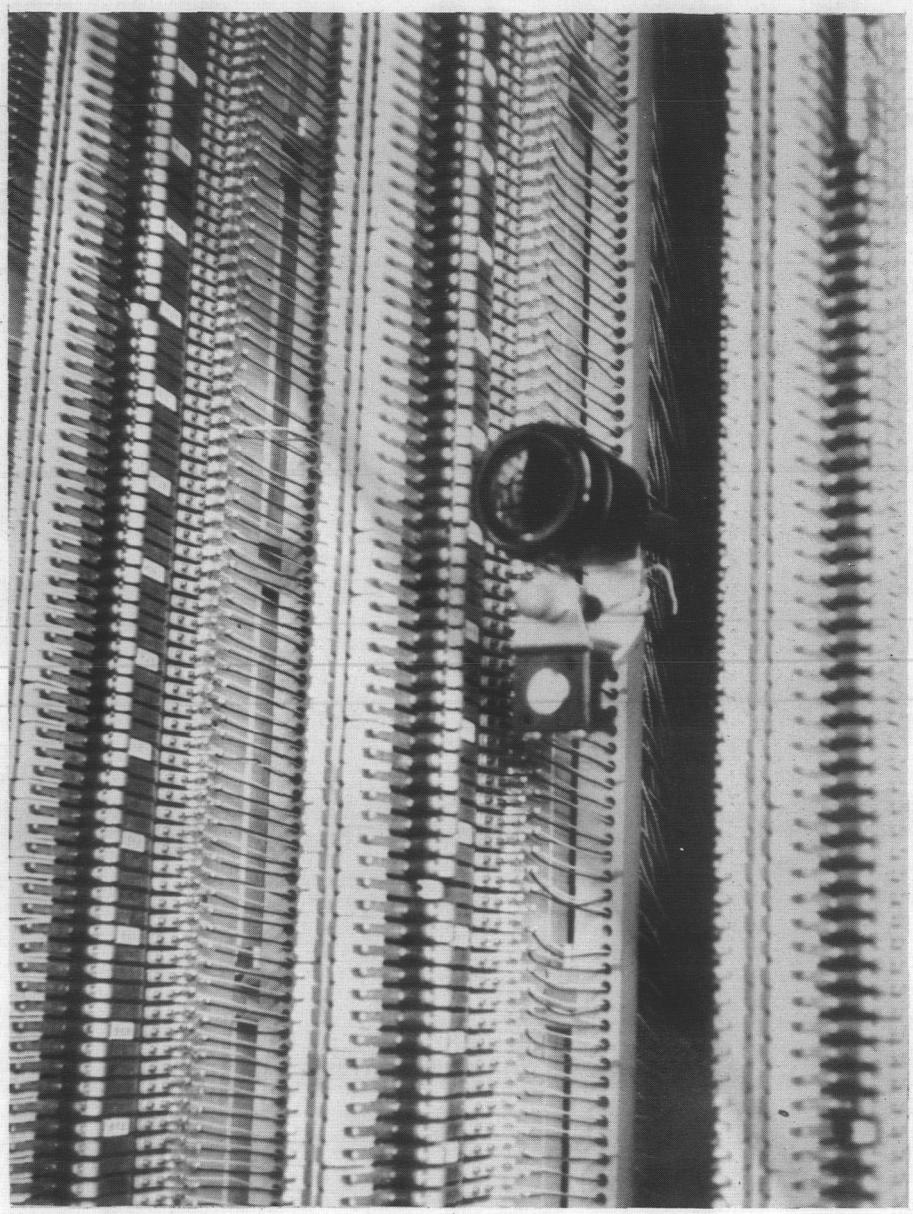
Special adaptations to other frames are shown on the following drawings:

H582-238 Mod. of ED92915-10 for mounting transmitter assembly on an IDF or non-standard MDF.

H577-136 Bracket for mounting transmitter and lamp on Number Group Frame, Translator Frame, Block Relay Frame or RR.

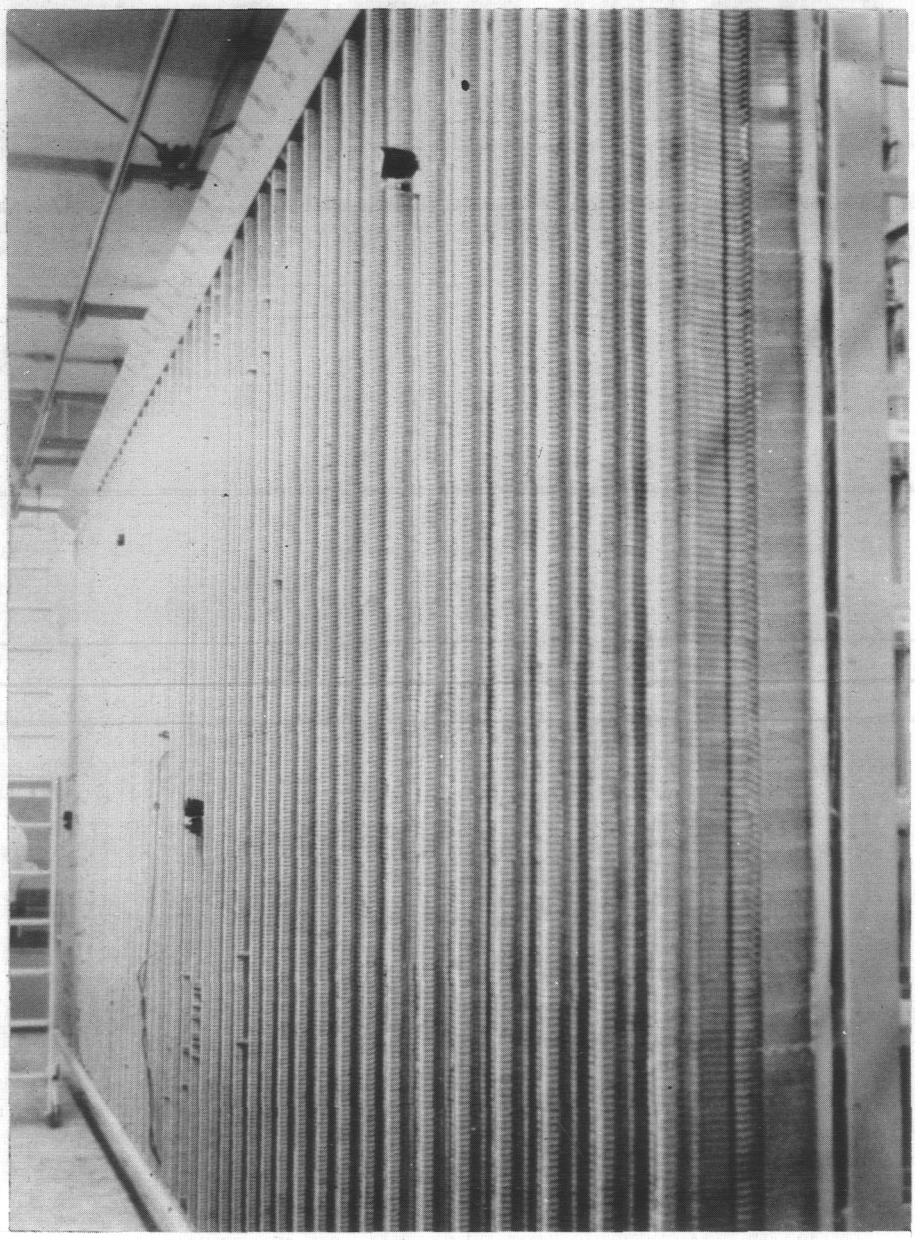


TRANSMITTER AND LAMP ASSEMBLY ON HORIZONTAL
SIDE OF MDF WITH PUSH BUTTON CONTROL



TRANSMITTER AND LAMP ASSEMBLY ON VERTICAL
SIDE OF MDF IN NORMAL POSITION

TRANSMITTER AND LAMP ASSEMBLY ON VERTICAL SIDE OF MDF IN SWING DOWN POSITION TO PROVIDE ACCESS OF GUN WRAPPING TOOL TO TERMINALS OF 300 TYPE CONNECTORS - 70 TYPE PROTECTORS SHOWN



VIEW SHOWING STAGGERED LOCATION OF TRANSMITTERS

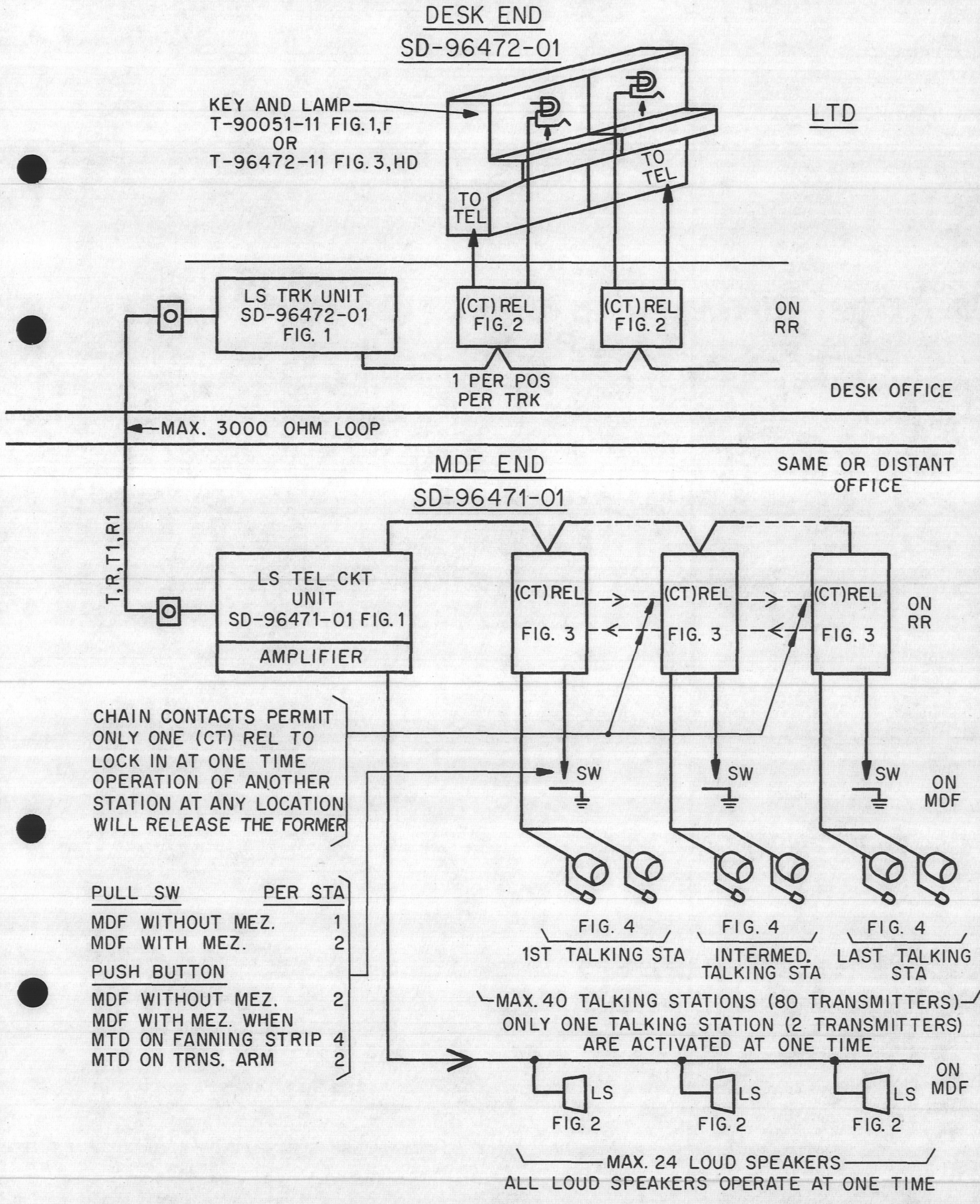
LOUD SPEAKER MOUNTED ON SUPERSTRUCTURE

7.3 Method of Operation

Call Originated at LTD Operation of the loud speaker trunk key at the LTD causes the lamp to light steady in all LTD positions as a busy indication and flashes all lamps at the distributing frame end at 120 IPM. When the frame man answers by operating the switch or push button at one of the talking stations, the lamps of that station will flash at 60 IPM and all other stations lamps will light steady. Two-way communications is then established between the distributing frame and the desk. All loud speakers operate simultaneously. Only the two transmitters of the operated talking station are activated at one time. Each transmitter has a pick up range of 6 to 10 feet and the two adjacent transmitters 8 feet apart or one talking station will pick up conversation over 16 feet of distributing frame. If the frame man moves to another station, operation of another station switch or push button will release the former station and the lamps of the newly activated station will flash at 60 IPM. When the key at the LTD is released, the lamps will be extinguished and the circuit will be restored to normal.

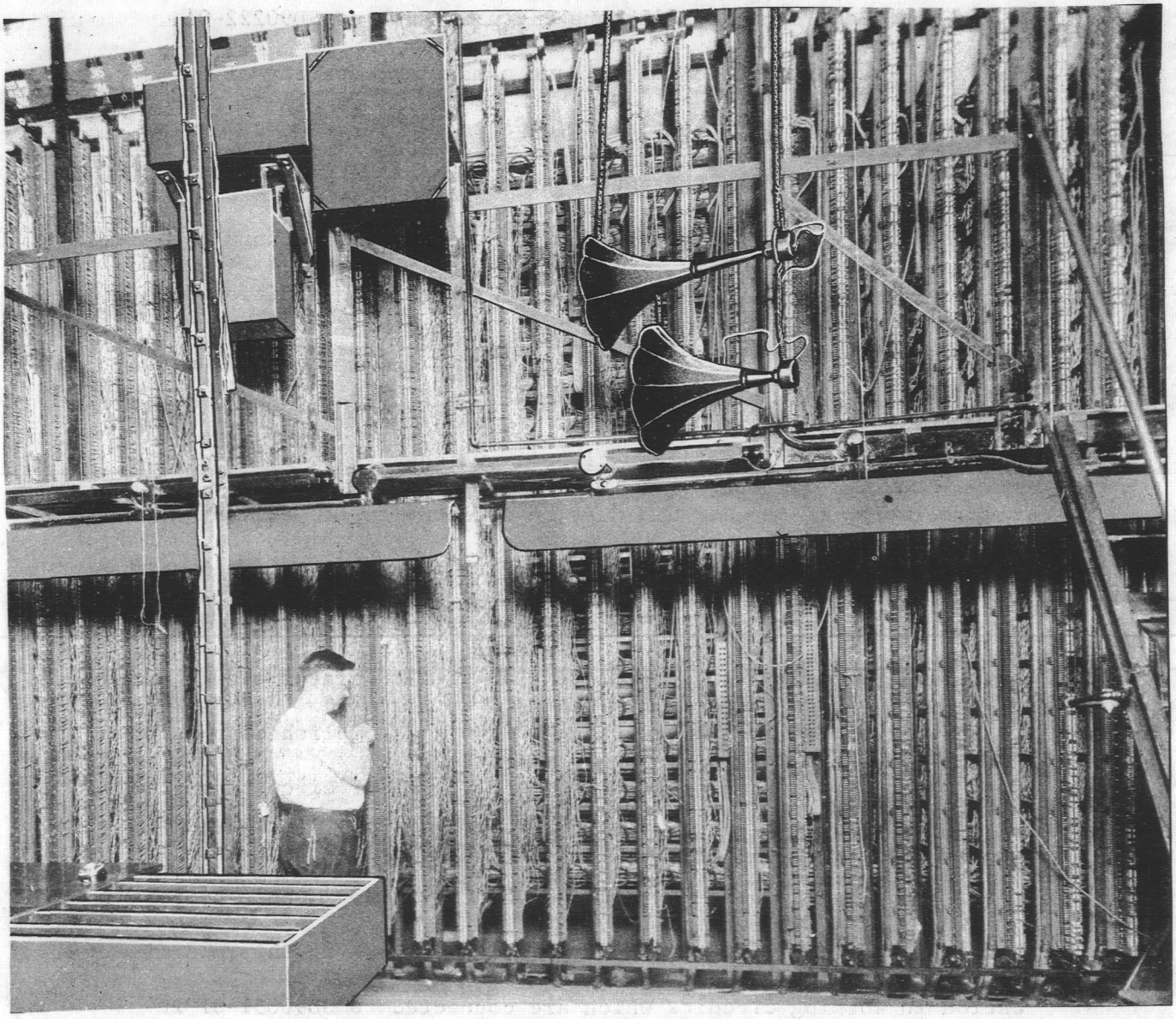
Call Originated at Distributing Frame When the switch or push button at the distributing frame is operated, the operated station lamps will flash at 60 IPM and all other station lamps will light steady. The corresponding trunk lamp at all positions of the LTD will flash at 60 IPM. When the trunk key is operated at one of the positions, the desk lamps will light steady. Two-way communication is then established and the circuit functions as described above.

MDF LOUD SPEAKER



7.4 Older Type Loud Speaker Telephone (Horn Type)

Older loud speaker telephone circuits such as SD90222-01, SD96284-01 and similar circuits have a maximum capacity of 6 talking stations, each consisting of a telephone receiver and horn used as a loud speaker and a transmitter and horn for talking back to the desk. The 360 transmitter and 4A horn used in these circuits is no longer obtainable and when additional talking stations are required in partially equipped circuits of this type, this equipment must be provided by the Telephone Company using equipment salvaged from circuits which have been replaced, if available, or the circuit must be replaced by the current standard. (See PEM 8001) These circuits operate over 6 wires to loud speaker trunk circuit SD90051-01 in the desk, the third pair being used for signalling, whereas SD96471-01 operates over 4 wires to SD96472-01 in the desk and signalling is accomplished on a loop basis over the two transmission pairs. The older circuits may be modified for 4-wire operation to connect to SD96472-01 when required to work into a new test desk, or to save a cable pair between buildings. No advantage is gained by making this modification in working circuits which are connected to SD90051-01 in the desk in the same building.



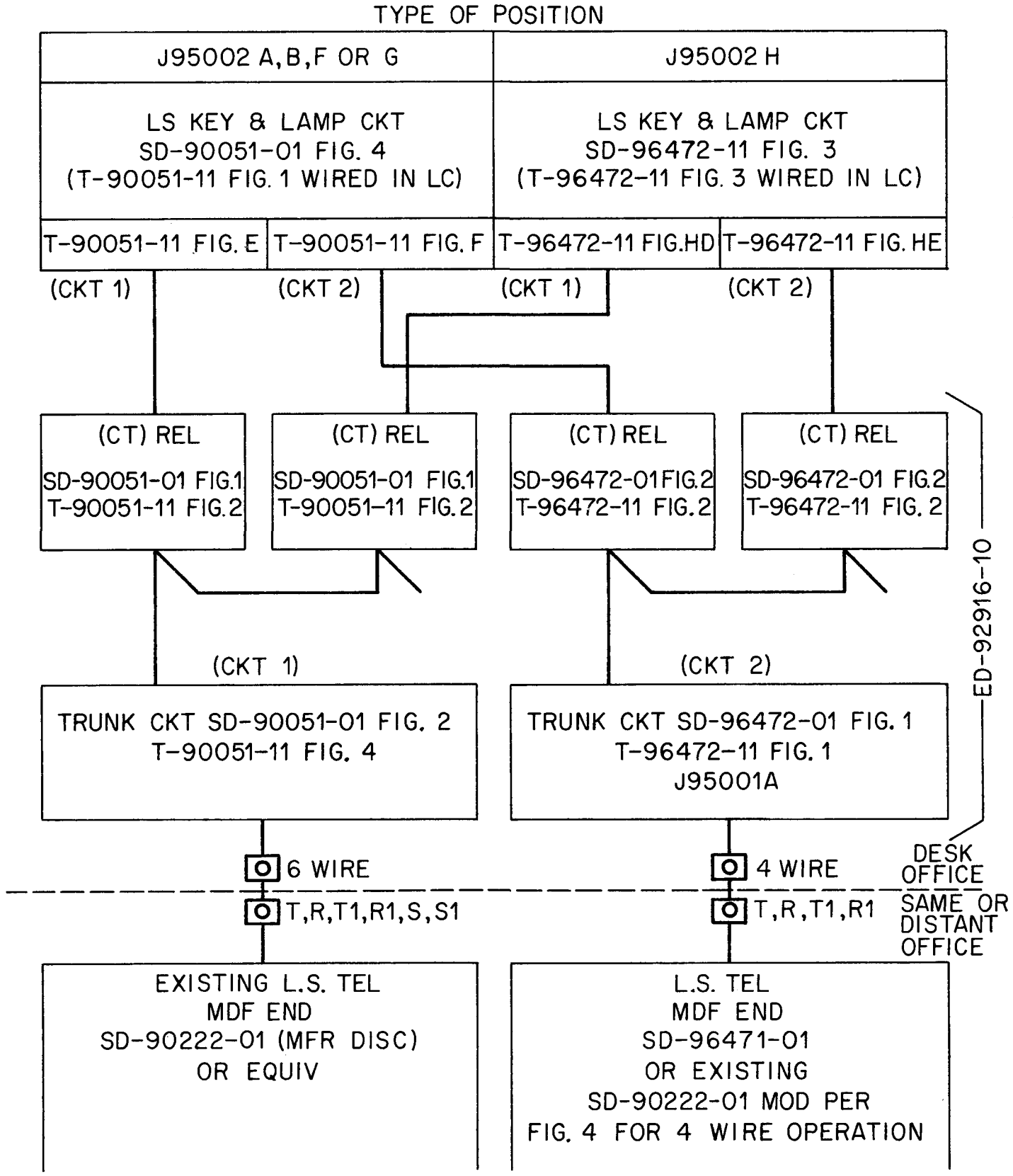
Horn Type Loud Speaker Telephone Equipment
at Main Distributing Frame
(Manufacture Discontinued)

7.5 Compatability

Position key and lamp circuit SD90051-01 Fig. 4 (T90051-11 Fig. 1) is wired in the local cable of J95002A, B and F or G series of desks. Position key and lamp circuit SD96472-01 Fig. 3 is wired in the local cable of J95002H series desks. The position wiring is identical and either position key and lamp circuit may be used with either trunk relay circuit by providing the proper outside cabling figure shown on the respective T- drawing. Trunk relay circuit SD90051-01 is required to connect to 6-wire circuits such as SD90222-01 and trunk relay circuit SD96472-01 is required to connect to 4-wire circuits such as SD96471-01 or to circuits of the older type which have been modified for 4-wire operation.

It is not necessary to change working circuits per SD90051-01 and SD90222-01 when adding trunks per SD96472-01 for connection to new outlying offices.

TYPICAL COMBINATIONS OF OLD AND NEW LOUD SPEAKER TEL CKT IN SAME DESK



FOR EQUIPMENT INFORMATION SEE J95001

8. Position Clocks

The position clock is located in the right hand side of the plug-shelf and serves two adjacent positions. It is provided in the odd positions for left to right growth desks and in the even positions for right to left growth desks. Two types of position clocks are in use.

8.1 Synchronous Clock (STD)

The synchronous motor driven clock (SD95012-01) is operated from 22V AC derived from commercial power supply and is the present standard. Desks made from J95002F-9 or earlier were equipped with KS-8263 clock (including parts) was discontinued and superseded by KS-14156 clock which is 1/2 inch wider. H502-142 was issued to modify the older plug shelves to accommodate the new clock. The plug shelves of positions made from J95002F-10 or later are arranged for the KS-14156 well mounted clock. 22V AC Power for these clocks may be obtained from a fuse on the fuse board or PRTD frame if available or from a relay rack mounted 50 volt-ampere AC power supply.

8.2 Impulse Clock (A and M only)

The 1A (10PPM) clock (SD90409-01) was originally designed to operate from the office master clock circuit which is no longer standard. In the absence of a master clock circuit, the 1A clocks may be operated from a 10IPM Synchronous interrupter circuit SD96343-01. The 1A clock is rated A & M only and is furnished only for additions to existing desks where this type of clock is in service. The plug shelves of older positions are drilled for the 1A clock and

12B number plate when required. In later positions the 1A clock, 12D number plate and a panel per ED90600-70 G8 are ordered separetely and mounted in the plug shelf in place of a blank panel by the installer.

9. Auxiliary Signal and Flashing Circuit

9.1 Auxiliary Signal Circuit

An auxiliary signal circuit is provided for each lineup of local test desk, repair service desk and test supervisor's private desk. The key and buzzer are generally located in the first position.

Its functions are as follows:

a. To provide a buzzer signal and to start the flashing circuit, if provided, when ground is received over the "A" lead from test or talking trunks on an incoming call. Separate connections are provided in the local test desk for two groups of talking and/or test trunks with separate "BUZ1" and "BUZ2" keys to silence the buzzer of either group.

b. To provide an optional bell signal at the local test desk which operates on incoming calls at the repair service desk, under control of a "BELL" key.

c. To prevent the audible signal from operating when the trunks are transferred to a switchboard at night.

9.101 Current Standard

SD95735-01 is the current standard auxiliary signal circuit for the Local Test Desk, Repair Service Desk and Test Supervisors Private Desk and has the following characteristics:

a. It contains 48V relays and buzzer.

b. It furnishes ground on the start lead of flashing circuit SD95725-01 to start flashing.

9.102 Old

SD90628-01 is the older vintage of auxiliary signal circuit for the Local Test Desk, and is used in conjunction with the transfer and auxiliary signal circuit SD90620-01 of the Repair Service Desk #2, and Test Supervisor's Private Desk and has the following characteristics:

a. It contains 24V relays and buzzer.

b. It is arranged to connect 60 IPM to flashing circuit SD90084-01 to start it flashing.

9.2 Flashing Circuit

The flashing circuit is required in Step-by-Step and No. 5 Crossbar offices and is provided in Panel and No. 1 Crossbar offices only when insufficient interrupter contacts are available and it is undesirable to add a new interrupter frame. Normally, flashing battery or ground in Panel or No. 1 Crossbar offices is obtained from the miscellaneous Interrupter Frame which operates continuously.

On an incoming call, the trunk circuit grounds the "A" lead of the auxiliary signal circuit which brings in an audible signal and starts the flashing circuit, if provided. The flashing circuit furnishes 24V or 48V interrupted battery to the "F" leads of the trunk circuits causing the lamps associated with the operated trunks to flash.

9.201 Current Standard

SD95725-01 shows the current standard flashing circuit and has the following characteristics:

a. It is common to all circuits in the office requiring flashing.

b. It will flash either 24V or 48V lamps or both.

c. It requires ground on the start lead from the associated circuit to start flashing.

9.202 Old

SD90084-01 (A & M only) is the older vintage of flashing circuit and has the following characteristics:

a. It serves only the Local Test Center.

b. It will flash only 24V lamps.

c. It requires 60 IPM from the auxiliary signal circuit to start flashing.

d. It is equipped with emergency flashing relays and an emergency flashing key (EFR) located in the first position of RSD or LTD.

9.3 Compatibility of Flashing and Auxiliary Signal Circuits

Auxiliary Signal Circuits SD90628-01 and SD90620-01 and Flashing Circuit SD90084-01 are not compatible with Auxiliary Signal Circuit SD95735-01 and Flashing Circuit SD95725-01 and cannot be mixed in any combination without modification.

When starting a new lineup of new and/or reused positions and a new flashing circuit is to be provided, Auxiliary Signal Circuit SD95628-01 and Flashing Circuit SD95725-01 are recommended.

When starting a new lineup of new and/or reused positions and Flashing Circuit SD90084-01 is to be reused Auxiliary Signal Circuits SD90628-01 and SD90620-01 should be provided.

For additions to a lineup where Flashing Circuit SD90084-01 is installed, this circuit should be retained and additional "F" leads should be provided per SD90084-01.

F. TEST TRUNKS AND CONNECTING CIRCUITS

The Test Trunk circuits terminate in the jack field of the Local Test Desk and provides a means for connecting the test cord circuit to the subscriber line over a clear T & R path for testing.

The following diagrams show the test train through which access is made to the subscriber line in various local switching systems.

NO. 14 LOCAL TEST DESK

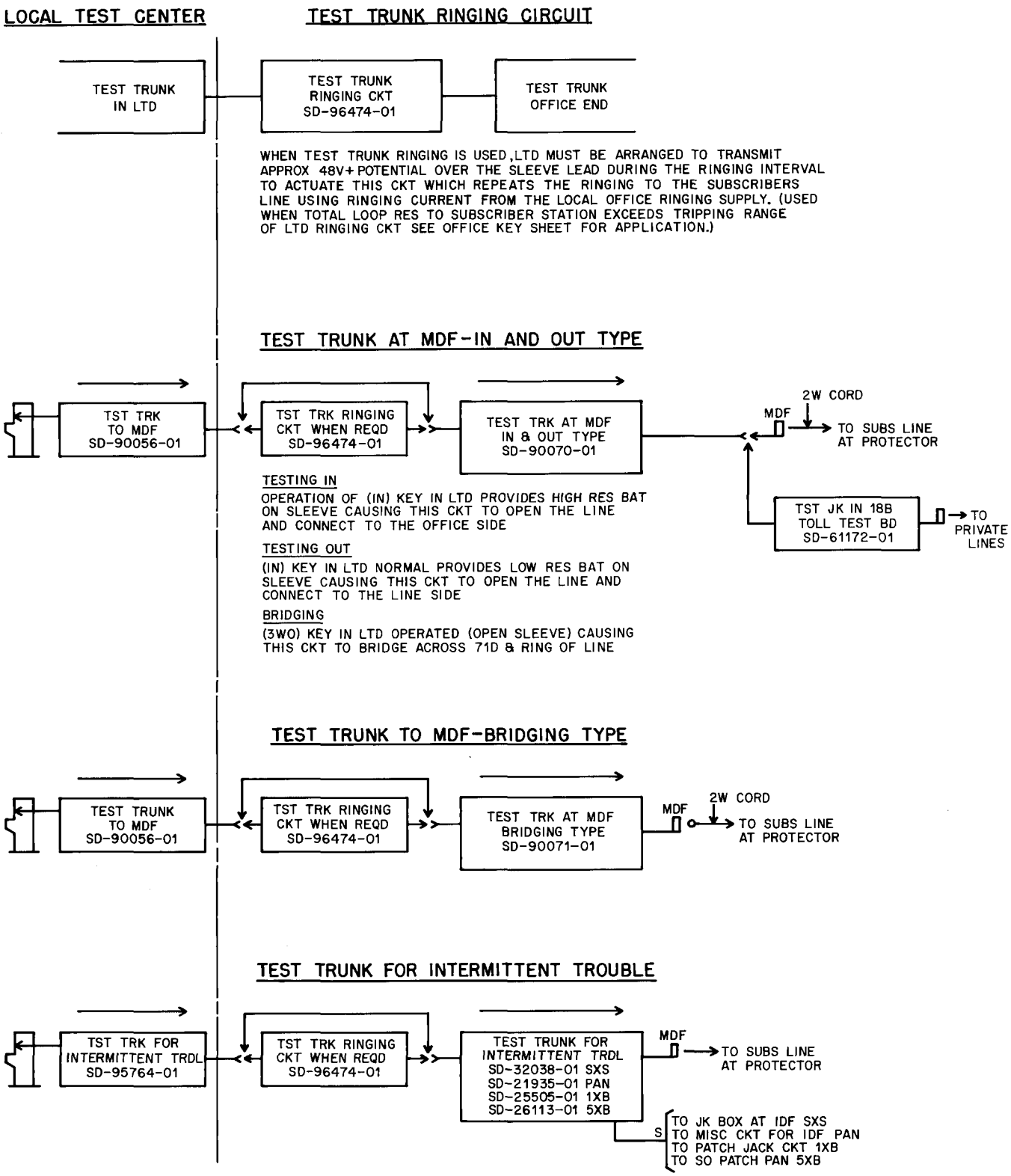
TEST TRUNKS - OFFICE END

Office End	Test Trunk	Code or Sys	#5XB	#1XB	SXS	Pan	Man	ESS#1	Conn Ckt In LTD No.14	Page
Common Systems										
SD96474-01	Tst Trk Ring	(E28 to E35)	x	x	x	x	x	x	SD95737-01 or SD90056-01	150
SD90070-01	TT at MDF(in & out type)	(AA)	x	x	x	x	x	x	"	150
SD90071-01	TT at MDF(Bridging)		x	x	x	x	x	x	"	150
SD95709-01	Tst Trk Sel		x	x	x	x		x	(SD90018-01MD)SD95737-01	154
SD25767-01	Tst Trk & Sel(PU,PS,LIT)	(1E10)	x	x	x			x	" "	154
SD96587-01	Tst Control Gas Press of Exchange Ca		x	x	x	x	x	x	" "	162
SD99321-01	Touch Tone Freq Applique Ckt		x	x	x	x		x	SD95737-01	153
SD90403-01	Wb Tst Trk (Man V3)		x	x	x	x	x	x	(SD90510-01MD)SD95765-01	151
SD95545-01	Wb Tst Trk (Auto V3)	(A2)	x	x	x	x	x	x	" "	151
Manual Office										
SD90507-01	TT to 1 & 2 SWBD								(SD90018-01MD)SD95737-01	154
SD62062-01	TT to #3 & 3CL SWBD								" "	154
SD13784-01	TT to #10 SWBD								" "	154
SD15343-01	TT to #12 SWBD								" "	154
SD15427-01	TT Intermittent Trbl								(SD96356-01MD)SD95764-01	150
Panel Office										
SD21354-01	TT 1st Sel(GCO)("B" SWBD Operation)								(SD90018-01MD)SD95737-01	156
SD21327-01	TT 1st Sel(BCO)("B" SWBD Operation)								" "	156
SD21927-01	TT 1st Sel(Call Distg "B" SWBD)								" "	156
SD21643-01	TT 1st Sel(GCO)(Dial Pls Oper)								" "	156
SD21642-01	TT 1st Sel(BCO)(Dial Pls Oper)								" "	156
SD21698-01	TT to SMB Fr (BCO PAN & #1XB)								" "	157
SD96187-01	TT from Dist or Off Mult(Pan & #1XB)								" "	157
SD21342-01	TT to OGTT Fr (GCO)								" "	157
SD90507-01	TT to "A" SWBD								" "	154
SD90589-01	TT for PU PAN								" "	154
SD96367-01	TT to OGTT Fr								" "	157
SD21935-01	TT Intermittent Trbl								(SD96356-01MD)SD95764-01	150

Office End	Test Trunk	Code	Conn Ckt in LTD No.14	Page
SXS Office				
SD31245-01	TT from Sel Level		(SD90018-01MD)SD95737-01	155
SD31349-01	Tst Distributor Control		" "	155
SD31401-01	Tst Distributor Control with PS		" "	155
SD32219-01	LIT Control		" "	210
SD31945-01	AT Sdr & ID TST (Auto Ticket)		" "	160
SD32208-01	AMA Sdr & ID Transverter TST		" "	160
SD32231-01	Line Ver AMA		" "	160
SD32246-01	Line Ver ANI		" "	160
SD90589-01	TT for PU Pan		" "	154
SD32038-01	TT Intermittent Trbl		(SD96356-01MD)SD95764-01	150
No. 1 Crossbar Office				
SD21698-01	TT at SMB(#1XB & Panel)		(SD90018-01MD)SD95737-01	157
SD25432-01	Inc Reg.(Sdr Operation)		" "	157
SD25432-01	Inc No Tst(Sdr Operation)		" "	157
SD25436-01	Inc Reg.& N.T.("B" SWBD Operation)		" "	157
SD96187-01	TT from Sec Off Mult(#1XB & Panel)		" "	157
SD96367-01	TT to OGTT Fr		" "	157
SD90589-01	TT for PU PAN		" "	154
SD25505-01	TT Intermittent Trbl		(SD96356-01MD)SD95764-01	150
No. 5 Crossbar Office				
SD25665-01(MD)	OGT to LTD(From Trk Link)	(1E15),(1E16)	(SD90018-01MD)SD95737-01	158
SD25708-01(MD)	Inc(DP)Reg or No Tst	Reg(1E18)N.T.(1E22)(1E23)	" "	158
SD25708-02(MD)	Inc(MF)Reg or No Tst	Reg(1E19)N.T.(1E24)(1E25)	" "	158
SD25708-03	TT at "B" SWBD	(E20) (E21) (Old E17)	" "	158
SD25745-01	TT at MTF or OGTT Fr	(1E12)	" "	158
SD26136-01	Inc Reg (DP or MF)	(E44)	" "	158
SD26136-01	Inc No Tst (DP or MF)	(E45)	" "	158
SD26137-01	OGT to LTD (from Trk Link)	(2E15)	" "	158
	With Coin Return After Disconnect	(2E16)	" "	158
SD25505-01(MD) SD26113-01	TT Intermittent Trbl	(1E7)	(SD96356-01MD)SD95764-01	150
No. 1 ESS Office				
SD1A186-01	Inc Trk from LTD (Dial or MF)		(SD90018-01MD)SD95737-01	159
SD1A187-01	OG Trk to LTD		" "	159

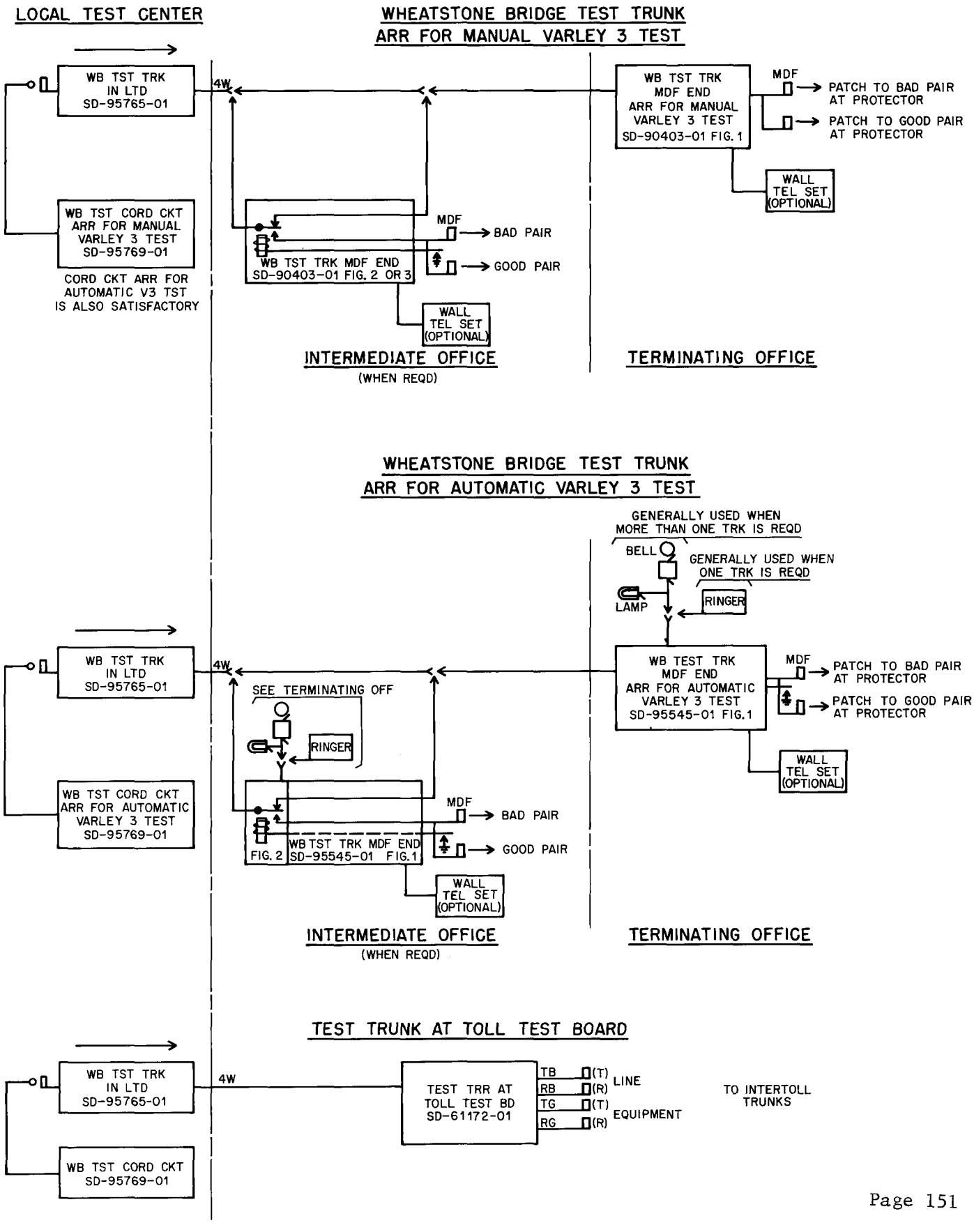
COMMON TEST TRUNK CIRCUITS

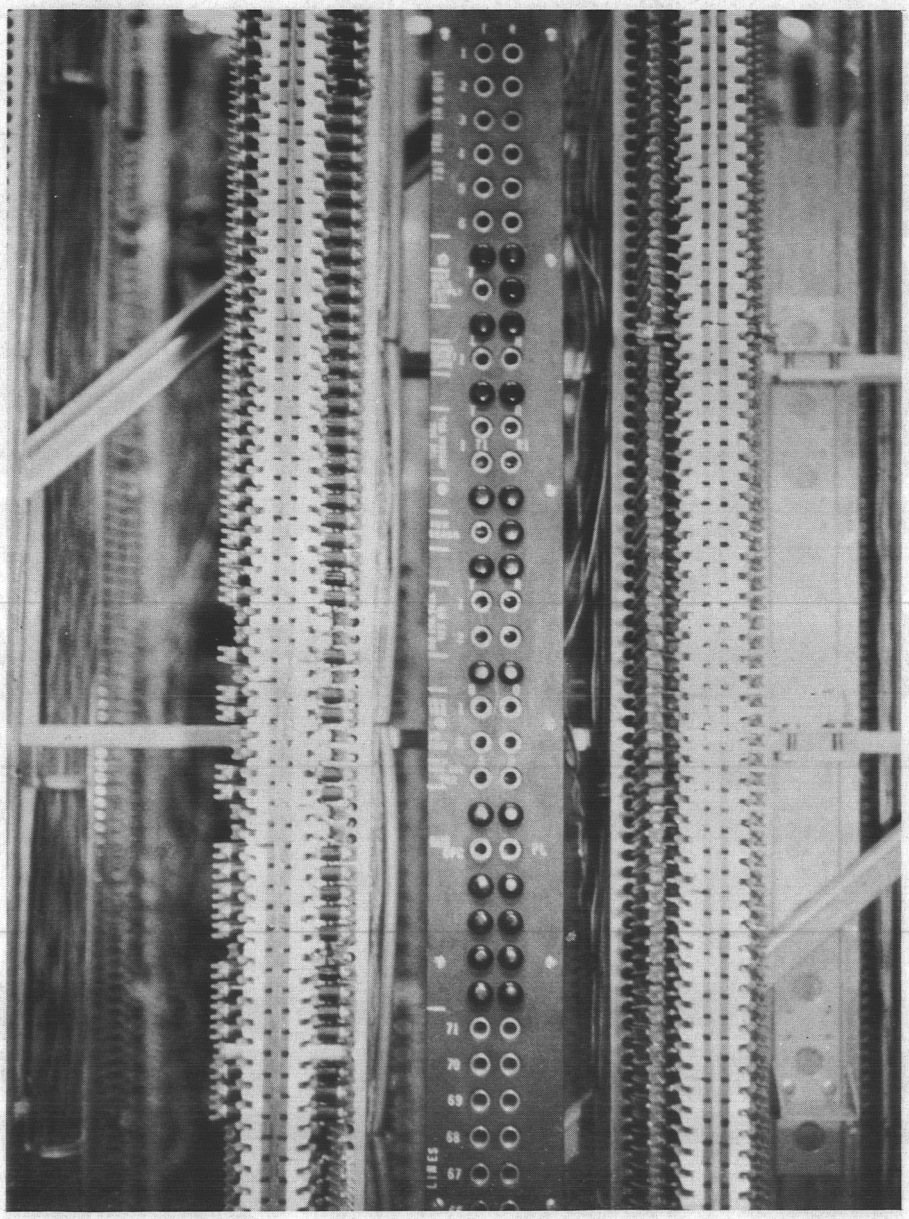
SAME OR DISTANT BUILDING


LOCAL TEST CENTER
TEST TRUNK RINGING CIRCUIT
TEST TRUNK IN LTD
TEST TRUNK RINGING CKT SD-96474-01
TEST TRUNK OFFICE END
WHEN TEST TRUNK RINGING IS USED,LTD MUST BE ARRANGED TO TRANSMIT APPROX 48V+ POTENTIAL OVER THE SLEEVE LEAD DURING THE RINGING INTERVAL TO ACTUATE THIS CKT WHICH REPEATS THE RINGING TO THE SUBSCRIBERS LINE USING RINGING CURRENT FROM THE LOCAL OFFICE RINGING SUPPLY. (USED WHEN TOTAL LOOP RES TO SUBSCRIBER STATION EXCEEDS TRIPPING RANGE OF LTD RINGING CKT SEE OFFICE KEY SHEET FOR APPLICATION.)
TEST TRUNK AT MDF-IN AND OUT TYPE
TST TRK TO MDF SD-90056-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
TEST TRK AT MDF IN & OUT TYPE SD-90070-01
2W CORD
MDF
TO SUBS LINE AT PROTECTOR
TST JK IN 18B TOLL TEST BD SD-61172-01
TO PRIVATE LINES
TESTING IN
OPERATION OF (IN) KEY IN LTD PROVIDES HIGH RES BAT ON SLEEVE CAUSING THIS CKT TO OPEN THE LINE AND CONNECT TO THE OFFICE SIDE
TESTING OUT
(IN) KEY IN LTD NORMAL PROVIDES LOW RES BAT ON SLEEVE CAUSING THIS CKT TO OPEN THE LINE AND CONNECT TO THE LINE SIDE
BRIDGING
(3WO) KEY IN LTD OPERATED (OPEN SLEEVE) CAUSING THIS CKT TO BRIDGE ACROSS 71D & RING OF LINE
TEST TRUNK TO MDF-BRIDGING TYPE
TEST TRUNK TO MDF SD-90056-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
TEST TRK AT MDF BRIDGING TYPE SD-90071-01
MDF
2W CORD
TO SUBS LINE AT PROTECTOR
TEST TRUNK FOR INTERMITTENT TROUBLE
TST TRK FOR INTERMITTENT TRDL SD-95764-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
TEST TRUNK FOR INTERMITTENT TRDL SD-32038-01 SXS SD-21935-01 PAN SD-25505-01 1XB SD-26113-01 5XB
MDF
TO SUBS LINE AT PROTECTOR
S
TO JK BOX AT IDF SXS
TO MISC CKT FOR IDF PAN
TO PATCH JACK CKT 1XB
TO SO PATCH PAN 5XB

ANY TYPE OFFICE
SAME OR DISTANT BUILDING

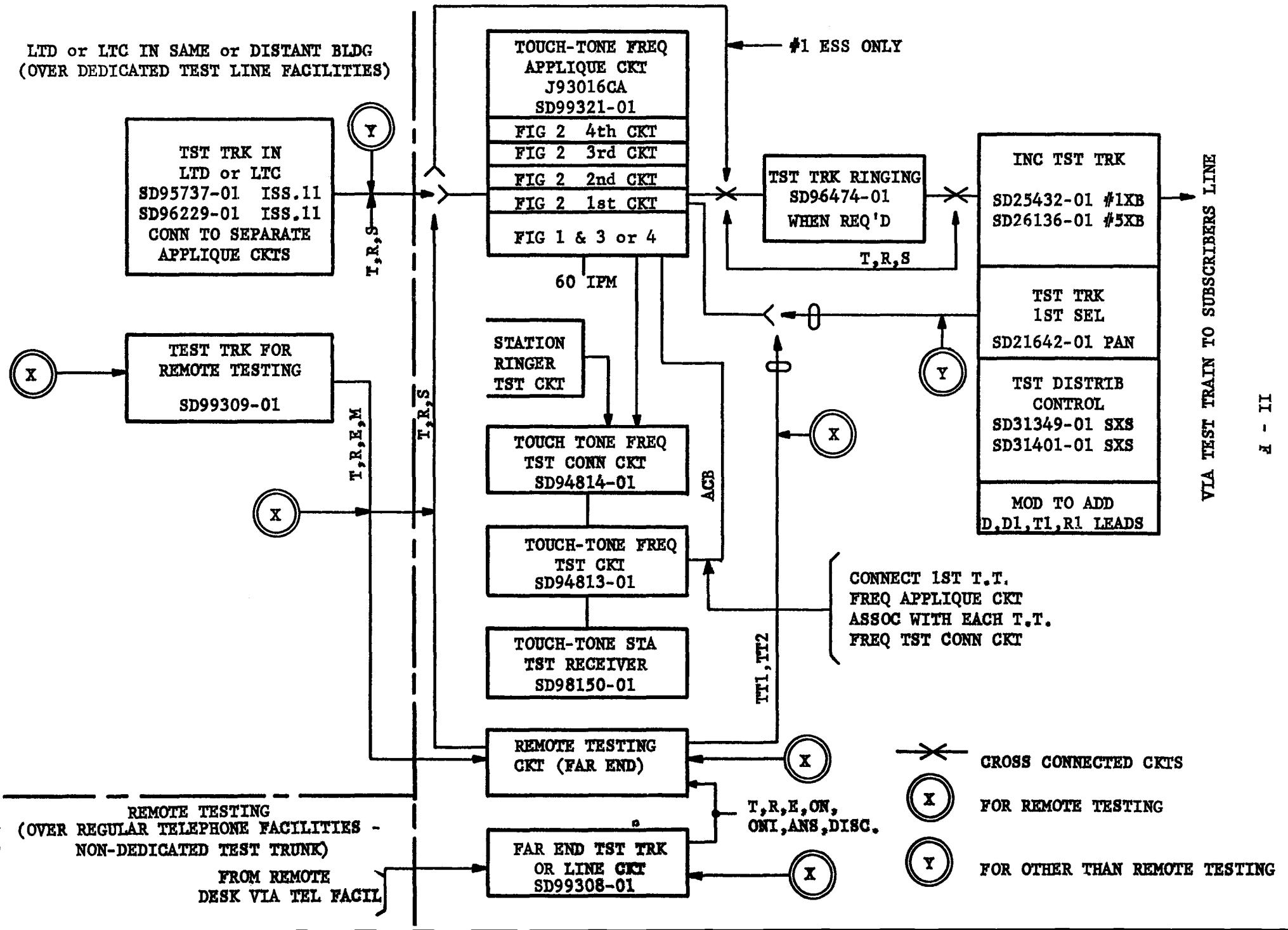
WB


LOCAL TEST CENTER
WHEATSTONE BRIDGE TEST TRUNK
ARR FOR MANUAL VARLEY 3 TEST
WB TST TRK IN LTD SD-95765-01
4W
WB TST TRK MDF END ARR FOR MANUAL VARLEY 3 TEST SD-90403-01 FIG. 1
MDF
PATCH TO BAD PAIR AT PROTECTOR
PATCH TO GOOD PAIR AT PROTECTOR
WALL TEL SET (OPTIONAL)
WB TST CORD CKT ARR FOR MANUAL VARLEY 3 TEST SD-95769-01
CORD CKT ARR FOR AUTOMATIC V3 TST IS ALSO SATISFACTORY
MDF
BAD PAIR
GOOD PAIR
WB TST TRK MDF END SD-90403-01 FIG. 2 OR 3
WALL TEL SET (OPTIONAL)
INTERMEDIATE OFFICE
(WHEN REQD)
TERMINATING OFFICE
WHEATSTONE BRIDGE TEST TRUNK
ARR FOR AUTOMATIC VARLEY 3 TEST
GENERALLY USED WHEN MORE THAN ONE TRK IS REQD
BELL
GENERALLY USED WHEN ONE TRK IS REQD
LAMP
RINGER
WB TST TRK IN LTD SD-95765-01
4W
WB TEST TRK MDF END ARR FOR AUTOMATIC VARLEY 3 TEST SD-95545-01 FIG.1
MDF
PATCH TO BAD PAIR AT PROTECTOR
PATCH TO GOOD PAIR AT PROTECTOR
WALL TEL SET (OPTIONAL)
SEE TERMINATING OFF
RINGER
WB TST CORD CKT ARR FOR AUTOMATIC VARLEY 3 TEST SD-95769-01
MDF
BAD PAIR
GOOD PAIR
FIG. 2
WB TST TRK MDF END SD-95545-01 FIG.1
WALL TEL SET (OPTIONAL)
INTERMEDIATE OFFICE
(WHEN REQD)
TERMINATING OFFICE
TEST TRUNK AT TOLL TEST BOARD
WB TST TRK IN LTD SD-95765-01
4W
TEST TRR AT TOLL TEST BD SD-61172-01
TB (T)
RB (R)
LINE
TG (T)
RG (R)
EQUIPMENT
TO INTERTOLL TRUNKS
WB TST CORD CKT SD-95769-01



View of Jack Box at VMDF

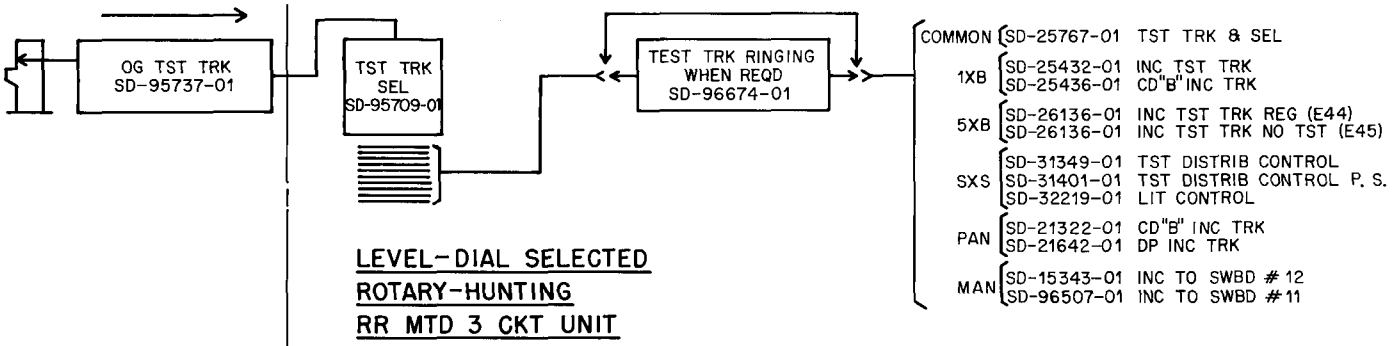
TOUCH-TONE FREQUENCY APPLIQUE CKT SD-99321-01



ALL DIAL OFFICES

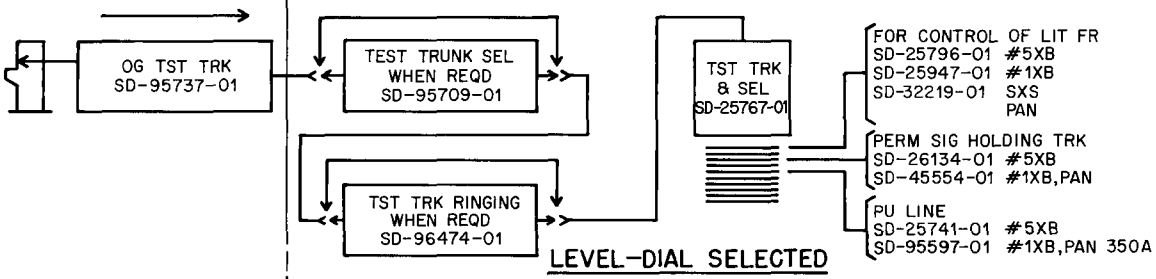
SAME OR DISTANT BUILDING

LOCAL TEST CENTER — TEST TRUNK SELECTOR


OG TST TRK SD-95737-01
TST TRK SEL SD-95709-01
TEST TRK RINGING WHEN REQD SD-96674-01
COMMON SD-25767-01 TST TRK & SEL
1XB SD-25432-01 INC TST TRK
SD-25436-01 CD"B" INC TRK
5XB SD-26136-01 INC TST TRK REG (E44)
SD-26136-01 INC TST TRK NO TST (E45)
SXS SD-31349-01 TST DISTRIB CONTROL
SD-31401-01 TST DISTRIB CONTROL P. S.
SD-32219-01 LIT CONTROL
PAN SD-21322-01 CD"B" INC TRK
SD-21642-01 DP INC TRK
MAN SD-15343-01 INC TO SWBD # 12
SD-96507-01 INC TO SWBD # 11

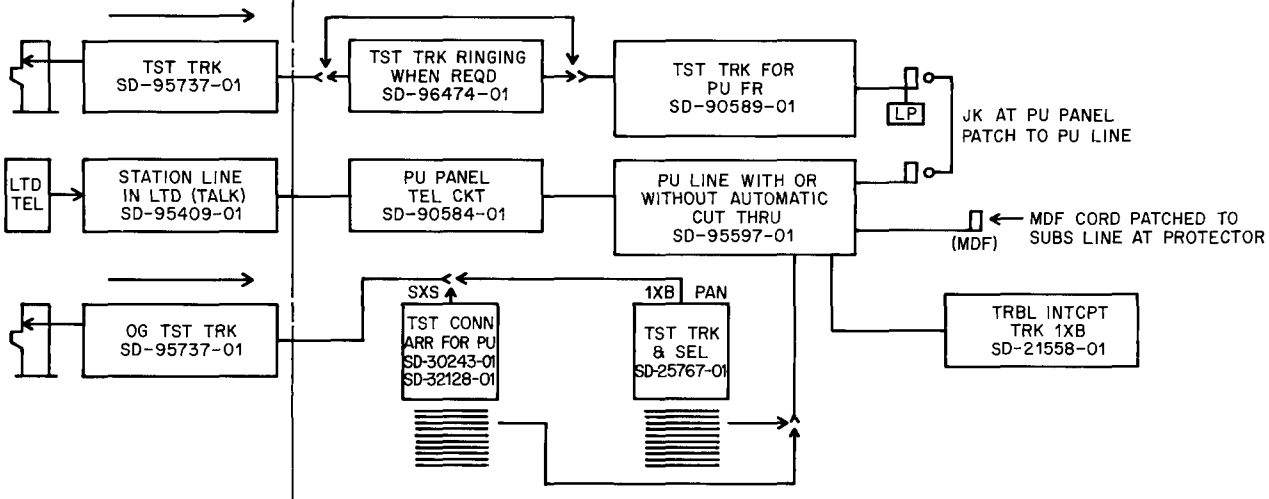
LEVEL-DIAL SELECTED
ROTARY-HUNTING
RR MTD 3 CKT UNIT

TEST TRUNK & SELECTOR

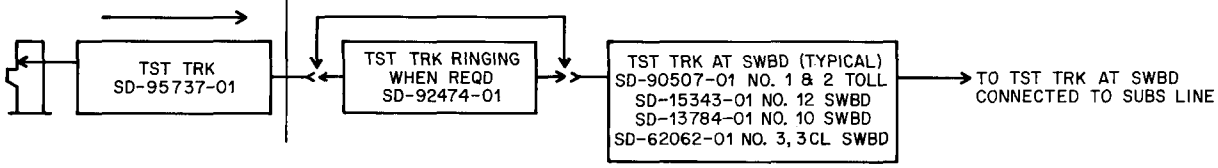


LEVEL-DIAL SELECTED
ROTARY-DIAL SELECTED
RR MTD 3 CKT UNIT

TEST TRUNK TO PLUGGING UP FR


TST TRK SD-95737-01
TST TRK RINGING WHEN REQD SD-96474-01
TST TRK FOR PU FR SD-90589-01
LP
JK AT PU PANEL PATCH TO PU LINE
LTD TEL
STATION LINE IN LTD (TALK) SD-95409-01
PU PANEL TEL CKT SD-90584-01
PU LINE WITH OR WITHOUT AUTOMATIC CUT THRU SD-95597-01
(MDF)
MDF CORD PATCHED TO SUBS LINE AT PROTECTOR
OG TST TRK SD-95737-01
SXS
TST CONN ARR FOR PU SD-30243-01 SD-32128-01
1XB PAN
TST TRK & SEL SD-25767-01
TRBL INTCPT TRK 1XB SD-21558-01

TEST TRUNK TO SWITCHBOARD

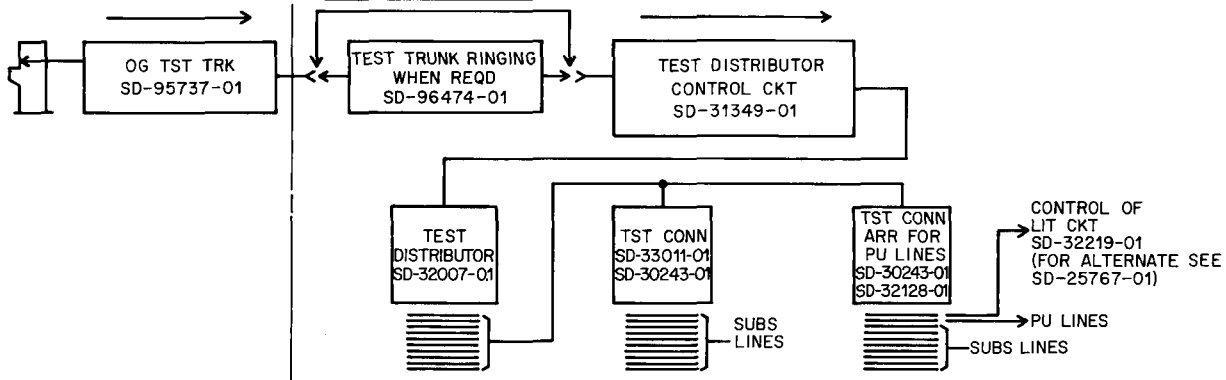

TST TRK SD-95737-01
TST TRK RINGING WHEN REQD SD-92474-01
TST TRK AT SWBD (TYPICAL) SD-90507-01 NO. 1 & 2 TOLL SD-15343-01 NO. 12 SWBD SD-13784-01 NO. 10 SWBD SD-62062-01 NO. 3, 3CL SWBD
TO TST TRK AT SWBD CONNECTED TO SUBS LINE

STEP BY STEP OFFICE

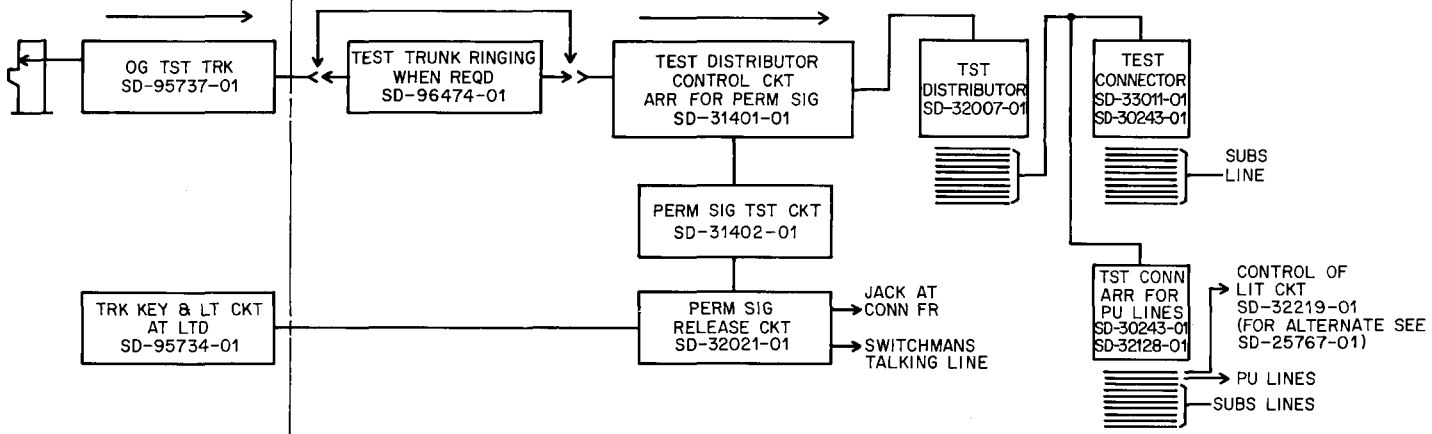
SAME OR DISTANT BUILDING

LOCAL TEST CENTER

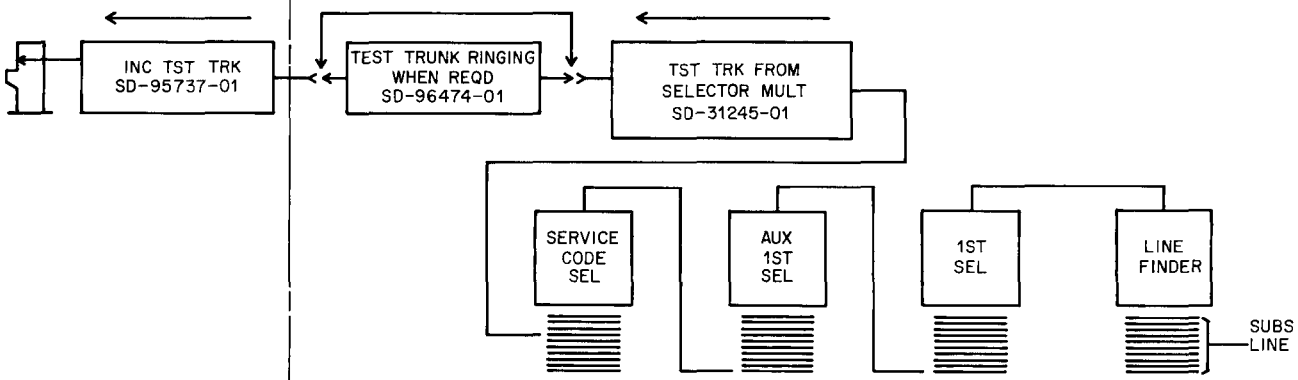
TEST TRUNK TO TEST DISTRIBUTOR
NOT ARRANGED FOR PERMANENT SIGNAL RELEASE



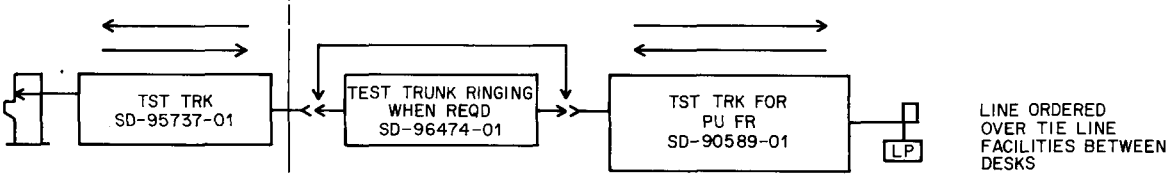
TEST TRUNK TO TEST DISTRIBUTOR
ARRANGED FOR PERMANENT SIGNAL RELEASE

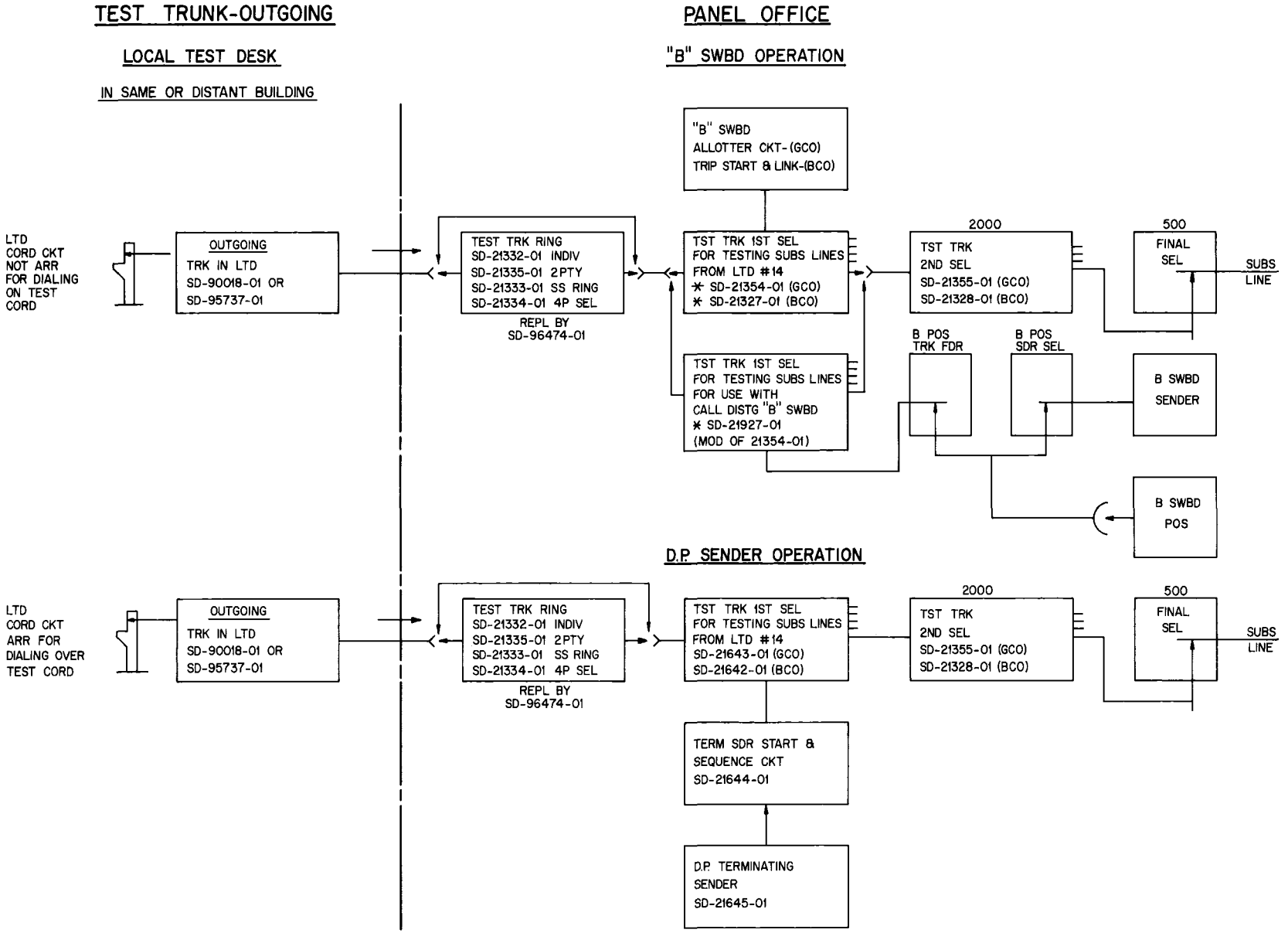


TEST TRUNK FROM SELECTOR MULTIPLE



TEST TRK TO PU FR- SXS, PAN, NO.1XB



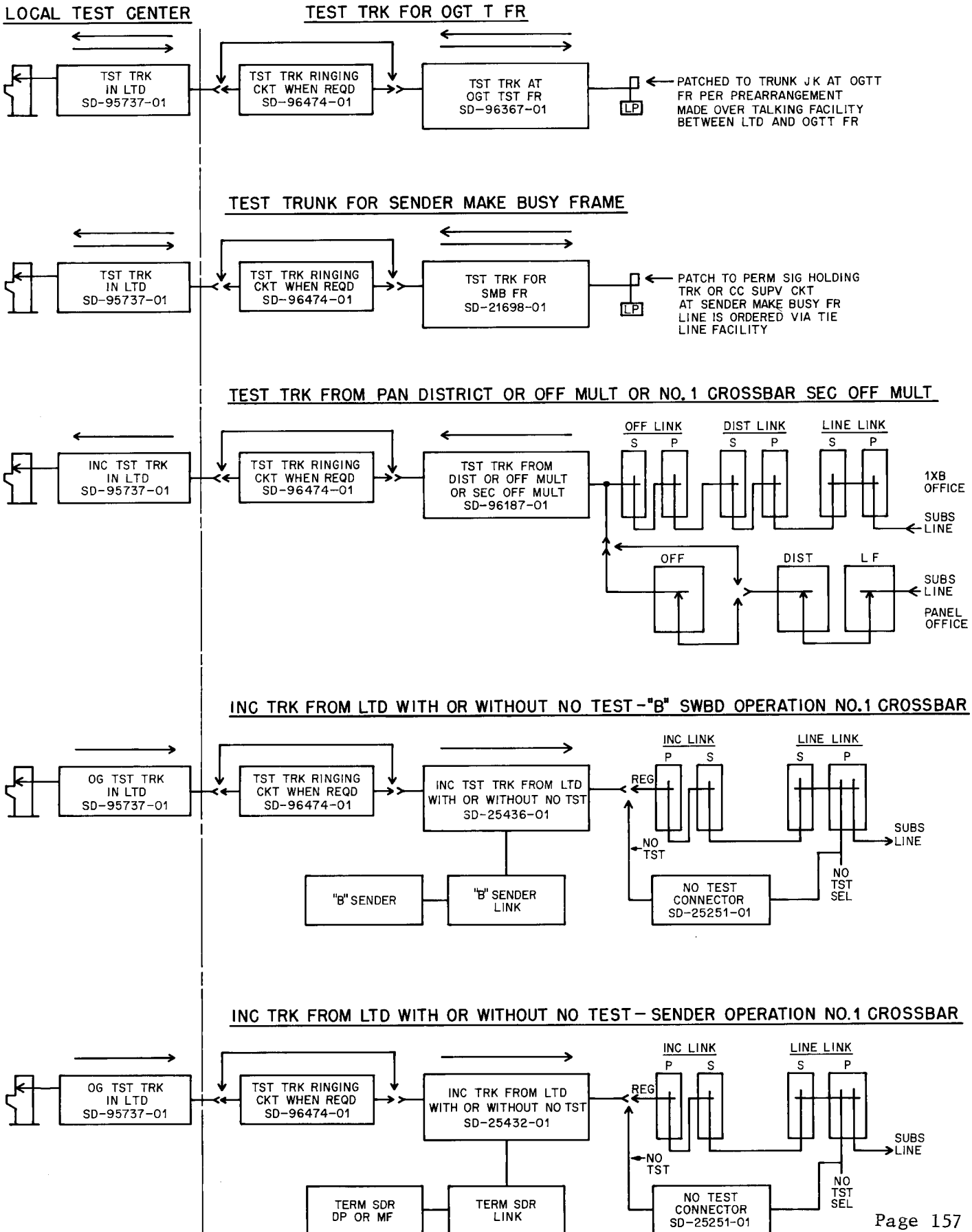


* FOR CONVERSION FROM "B" SWBD OPERATION TO TERMINATING SENDER OPERATION:

MOD CKT	TO CKT	T DRAWING	ADD SUP LC	MODIFY EQPT	TO AGREE WITH	
SD-21354-01 (GCO) OR SD-21927-01 (GCO)	SD-21643-01	T-21643-11,-12,-13,-14 (SEE NOTE 56 ON -12)	LC416-000G3	J21601B-1, B-2, C-1	J21601E-1	NO CHG REQD IN 2ND SEL
SD-21327-01 (BCO)	SD-21642-01	T-21642-11,-12,-13,-14	LC P426032 (UNIVERSAL WRG) OR JOB LC OMITTING UNNECESSARY LEADS	J21601A-1, A-2	J21601D-1	

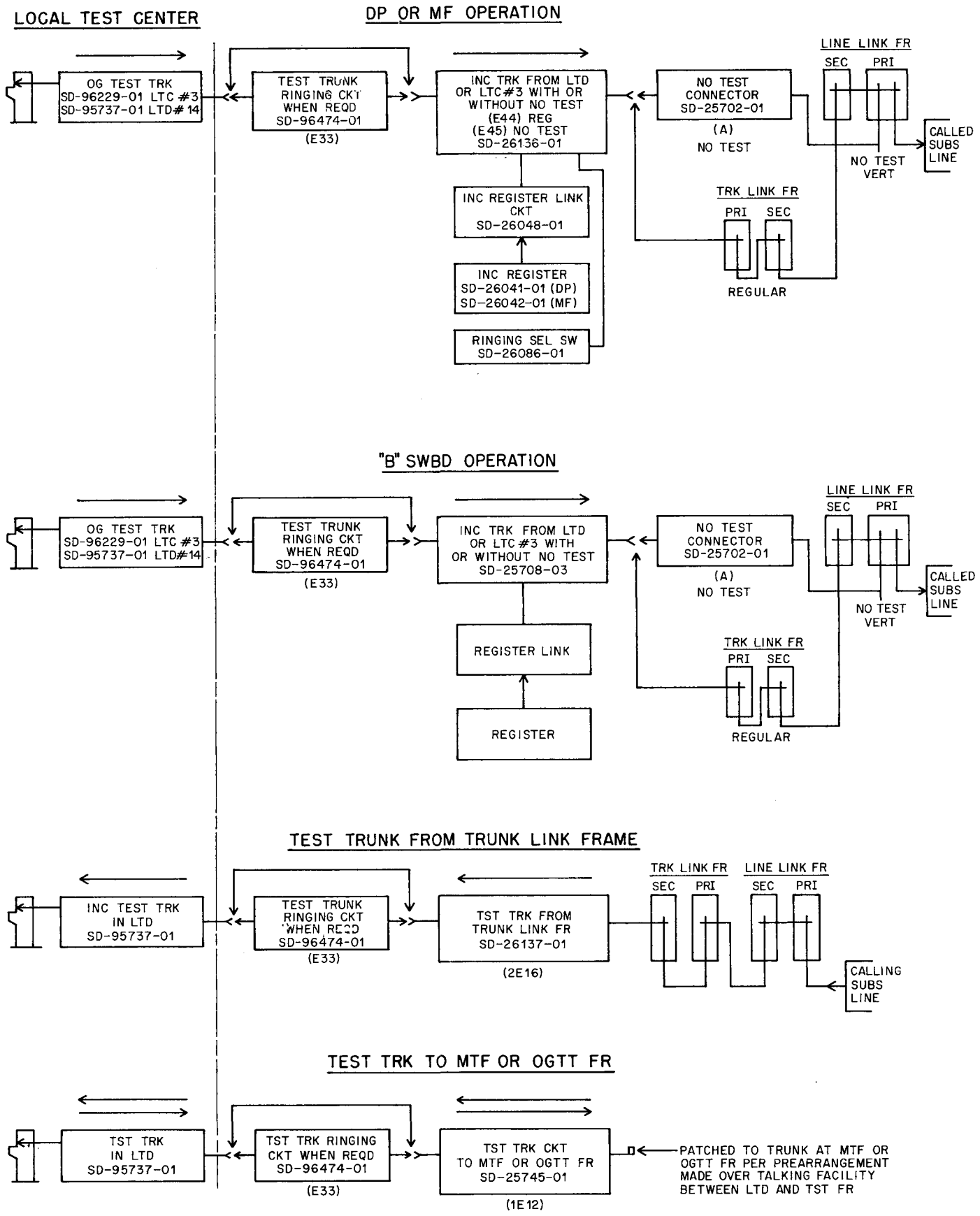
PANEL & NO. 1 CROSS BAR OFFICE

SAME OR DISTANT BUILDING


LOCAL TEST CENTER
TEST TRK FOR OGT T FR
TST TRK IN LTD SD-95737-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
TST TRK AT OGT TST FR SD-96367-01
LP
PATCHED TO TRUNK JK AT OGTT FR PER PREARRANGEMENT MADE OVER TALKING FACILITY BETWEEN LTD AND OGTT FR
TEST TRUNK FOR SENDER MAKE BUSY FRAME
TST TRK IN LTD SD-95737-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
TST TRK FOR SMB FR SD-21698-01
LP
PATCH TO PERM SIG HOLDING TRK OR CC SUPV CKT AT SENDER MAKE BUSY FR LINE IS ORDERED VIA TIE LINE FACILITY
TEST TRK FROM PAN DISTRICT OR OFF MULT OR NO. 1 CROSSBAR SEC OFF MULT
INC TST TRK IN LTD SD-95737-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
TST TRK FROM DIST OR OFF MULT OR SEC OFF MULT SD-96187-01
OFF LINK
DIST LINK
LINE LINK
S P
1XB OFFICE
SUBS LINE
OFF
DIST
L F
SUBS LINE
PANEL OFFICE
INC TRK FROM LTD WITH OR WITHOUT NO TEST-"B" SWBD OPERATION NO.1 CROSSBAR
OG TST TRK IN LTD SD-95737-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
INC TST TRK FROM LTD WITH OR WITHOUT NO TST SD-25436-01
INC LINK
LINE LINK
P S
S P
REG
NO TST
SUBS LINE
"B" SENDER
"B" SENDER LINK
NO TEST CONNECTOR SD-25251-01
NO TST SEL
INC TRK FROM LTD WITH OR WITHOUT NO TEST - SENDER OPERATION NO.1 CROSSBAR
OG TST TRK IN LTD SD-95737-01
TST TRK RINGING CKT WHEN REQD SD-96474-01
INC TRK FROM LTD WITH OR WITHOUT NO TST SD-25432-01
INC LINK
LINE LINK
P S
S P
REG
NO TST
SUBS LINE
TERM SDR DP OR MF
TERM SDR LINK
NO TEST CONNECTOR SD-25251-01
NO TST SEL

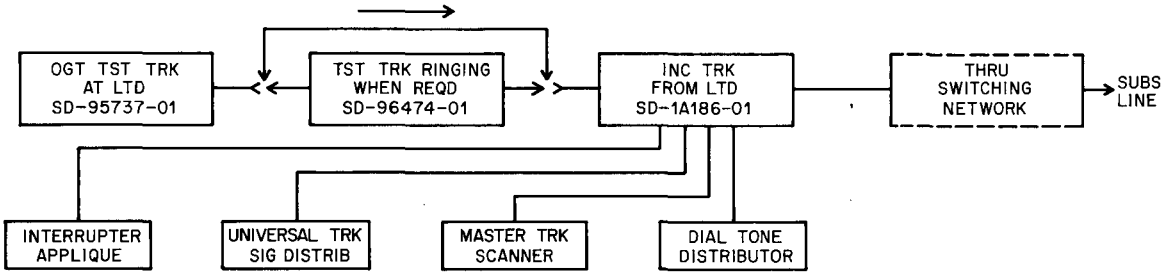
NO. 5 CROSS BAR OFFICE

SAME OR DISTANT BUILDING

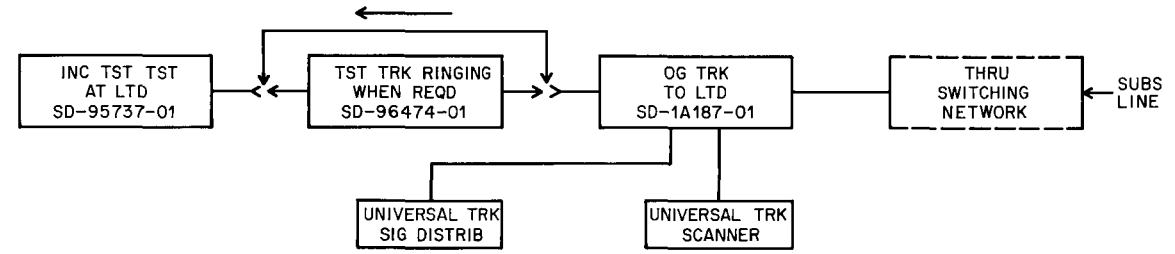


ESS NO. 1 OFFICE

INCOMING TRK FROM LTD SD-1A186-01



O. G. TRK TO LTD SD-1A187-01


INC TST TST AT LTD SD-95737-01
TST TRK RINGING WHEN REQD SD-96474-01
OG TRK TO LTD SD-1A187-01
THRU SWITCHING NETWORK
SUBS LINE
UNIVERSAL TRK SIG DISTRIB
UNIVERSAL TRK SCANNER

7. Circuits Using Test Train in Common With LTD

On dial offices where access to the subscriber line for testing is obtained through a switch train, the switch train assoicated with the Local Test Desk test trunk circuit SD95737-01 may also be shared by one of the following automatic test circuits:

a. SXS Line Verification Circuit for ANI or AMA

b. SXS Sender Identification Circuit for AMA

c. SXS Automatic Ticketing Sender Identifier Circuit

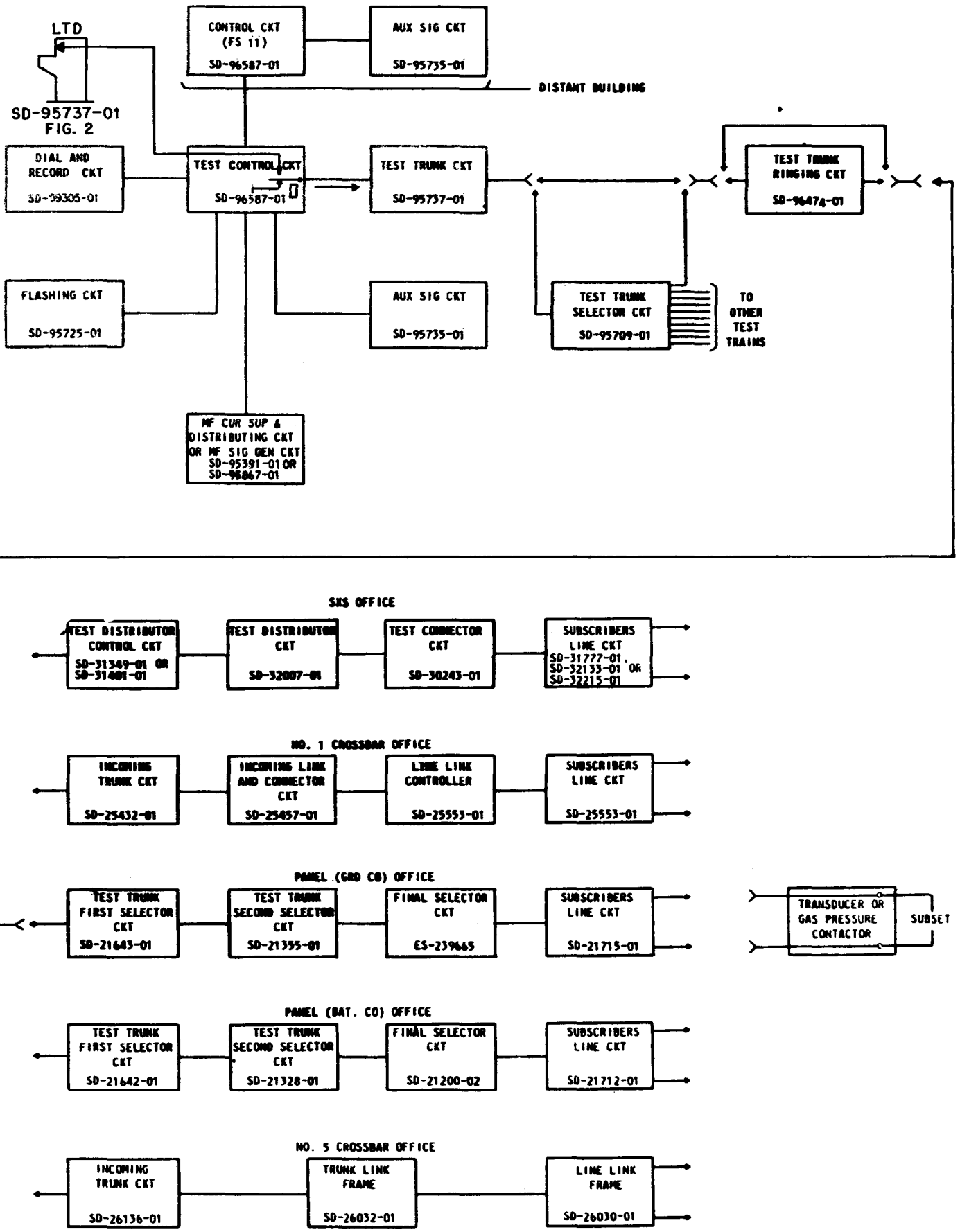
d. Automatic Line Insulation Test Circuit

e. Test & Control Circuit for Locating Gas Pressure Leaks in Exchange Cable.

When the test train is in use by the test desk, a busy indication is given to the above circuits and similarly when the associated circuit seizes an idle test train the busy lamp of that trunk appearance in the local test desk will light as an indication that the trunk is in use.

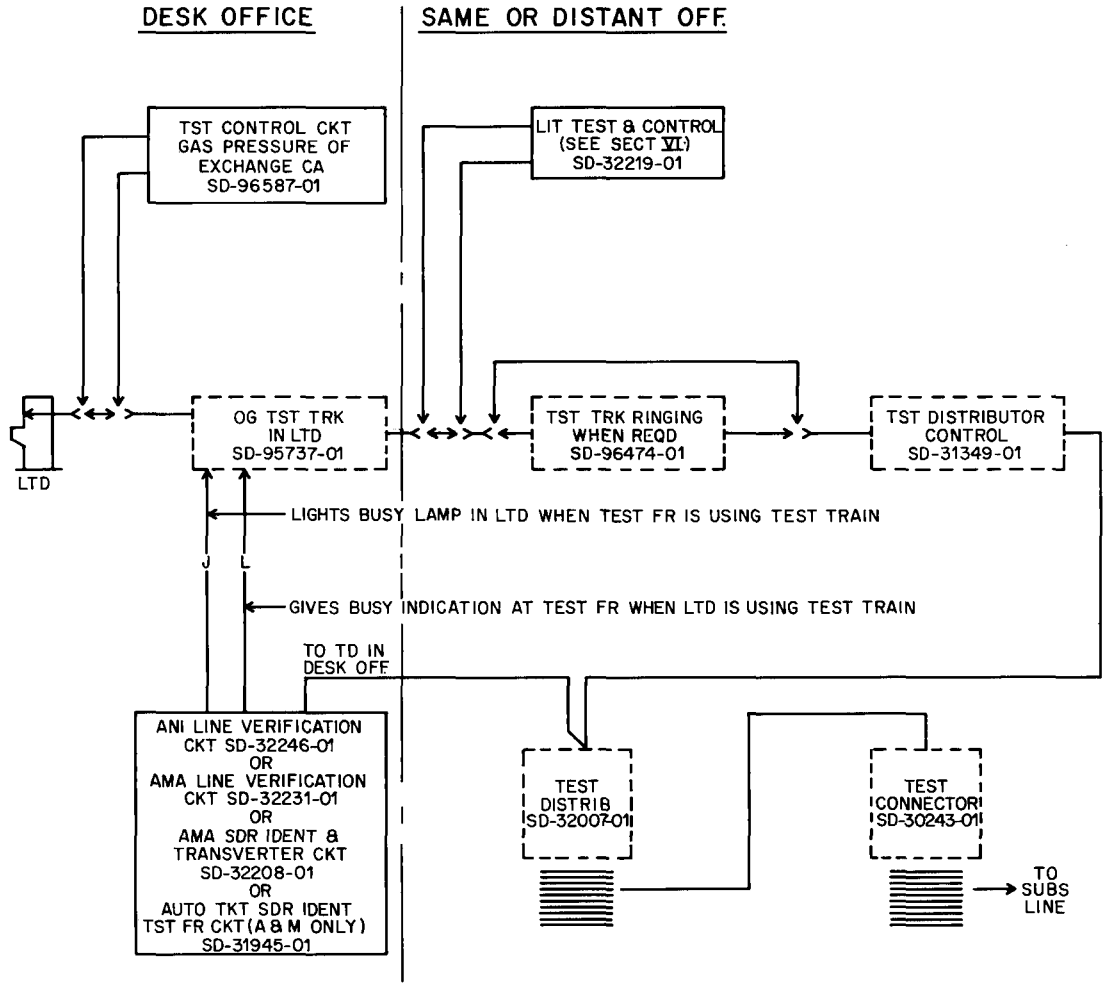
TST CONTROL CKT-AUTOMATIC DETECTION OF GAS PRESSURE IN EXCHANGE CA.

SD-96587-01



TEST CIRCUITS USING TEST TRAIN IN COMMON WITH LTD

STEP BY STEP OFFICE



A SEPARATE TRUNK CKT SD-95737-01 IS REQUIRED FOR EACH CIRCUIT USING A TEST TRAIN IN COMMON WITH THE LTD

SECTION III

NO. 2 REPAIR SERVICE DESK

		PAGE
A.	GENERAL	
	1. Capacity	165
	2. List of Drawings	167
	3. Table of Compatibility	168
	4. Floor Plan Data	169
	5. Illustrations	171
B.	FRAMEWORK & EQUIPMENT	173
	1. Writing Shelf	173
	2. Card Compartment Assembly	173
	3. Light Load Turret	174
	4. Finish	174
	5. Cabling	174
	6. Cable Protection Panel	174
	7. Illustrations	175
C.	CIRCUIT FEATURES	180
	1. Telephone Circuit	180
	1.01 Trunk Key and Lamp Circuit	180
	1.02 Splitting Key Circuit	181
	1.03 Auxiliary Telephone Circuit	181
	1.04 Ringing Circuit	182
	1.05 Outgoing Call Circuit	182
	1.06 Incoming Call Circuit	182
	1.07 Monitoring	182
	1.08 Service Observing	182
	1.09 Transmission Testing	183
	1.10 Light Load Turret	183
	1.11 Mult of RS Trunks in LTD	183

PAGE

C. CIRCUIT FEATURES (Con't.)

2. Clock Circuit 184

2.01 Synchronous Clock 184

2.02 Impulse Clock 184

3. Transmission Test Circuit 184

4. Auxiliary Signal & Flashing Circuits 184

5. Framework Ground 185

6. Trunk Circuits 185

6.01 Service Observing on Trunks 185

6.02 Repair Service Observing Recorder 185

D. SPECIAL ADAPTATIONS OF RSD 186

1. Call Director Sets for RSD 186

2. Rotary Files 186

SECTION III

NO. 2 REPAIR SERVICE DESK

A. GENERAL

The Repair Service Desk is designed to provide facilities for receiving and recording calls from subscriber reporting service trouble and lines out of order, and for filing the line record cards. These facilities consists of one or more writing shelf positions and a number of card compartments arranged in any floor plan configuration to meet the plant department's requirements. The writing shelf contains the talking facilities and associated equipment and provide a writing surface for filling out the cards. The writing shelf is usually mounted between and supported by two card compartments. When a card compartment is not located adjacent to the writing shelf the free end or ends of the writing shelf must be supported by leg assemblies.

The height of the writing surface when mounted with the card compartments is 36 inches above the floor and foot rails are provided for use with standard operators' chairs. The chairs are furnished by the Telephone Company.

An Auxiliary telephone circuit and splitting key may be provided for periods of heavy traffic. By the operation of the splitting key, the last seven trunks may be answered by an auxiliary operator seated at the rear of the position and the remaining eight trunks by the regular operator seated at the front.

A Light Load Turret containing a multiple of the trunks which appear in the other positions of the lineup may be mounted on the light load position in large installations to give one operator access to all of the trunks during periods of light load.

The light load turret should not be placed on a position having the auxiliary telephone and splitting key feature since it would block the auxiliary operator.

The writing shelf may also be used as a Dispatcher's Desk or other supplementary desk. A 30 inch leg assembly is available for this purpose for use with standard office desk chairs.

NO. 2 REPAIR SERVICE DESK

Capacity - Each Position

1 - Telephone Circuit

15 - Trunk Key & Lamp Circuits

1 - Ringing Key Circuit

1 - Splitting Key Circuit

1 - Auxiliary Telephone Circuit

1 - Auxiliary Ringing Key Circuit

24 - Call Circuits

1 - Clock Circuit

1 - Transfer Key Circuit (1 per lineup)

1 - Auxiliary Signal Circuit (1 per lineup)

1 - MW Supply Jack Circuit

2. DRAWINGS

COMPLETE LIST OF #2 RSD SPECIFICATIONS

Drawing	Rating	Date in Use	Repl By	Tel Ckt	Aux Tel
J94801A-1	Mfr Disc	1929 - 30	J94801A-2	SD90044-01	SD90225-01
A-2	"	1930 - 31	A-3	"	"
A-3	"	1931 - 32	A-4	"	"
A-4	"	1932 - 32	A-5	"	"
A-5*	"	1932	A-6	"	"
A-6*	"	—	A-7	"	"
A-7*	"	1950	A-8	"	"
A-8	"	1950 - 56	B-1	"	"
B-1	Standard	1956-Date	—	SD95717-01	SD95717-01

* J94801A-5 was renumbered A-6 and A-6 was renumbered A-7.

LIGHT LOAD TURRET

ED90166-10	Light Load Turret Eqpt -	30 or 90 trunk capacity
ED90166-31	" " " Assem -	30 trunk capacity
ED90167-31	" " " Assem -	90 trunk capacity

CARD COMPARTMENT

ED90196-30	Card Compartment

LEG ASSEMBLY

ED90211-30	Leg Unit	36" high
ED90215-30	Leg Unit Single Sided	30" high
ED90245-30	Leg Unit Double Sided	30" high

FOOT RAIL

ED90213-12	Writing Shelf Assem & Footrail

CABLE PROTECTION PANEL

ED90685-30 Cable Protection Panel Assembly

CABLING PLAN

ED90191-01 Local Cable Plan

3. TABLE OF COMPATIBILITY NO. 2 RSD POSITION

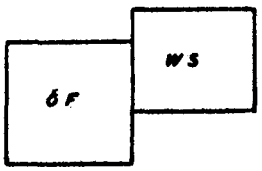
Item	Initial Pos.	Pos Which May be Added		Rating	Aux Sig	Flashing
1	J94801B with 48V lamps	J94801B with 48V lamps	* J94801A with 48V lamps	Std	SD95735-01 See Note 1	SD95725-01 or Misc Int See Note 1
2	J94801A with 24V lamps	J94801B with 24V lamps	J94801A with 24V lamps	A & M Only	SD90620-01 See Note 1	SD90084-01 See Note 1

* J94801A Requires 24V Battery for the Relays

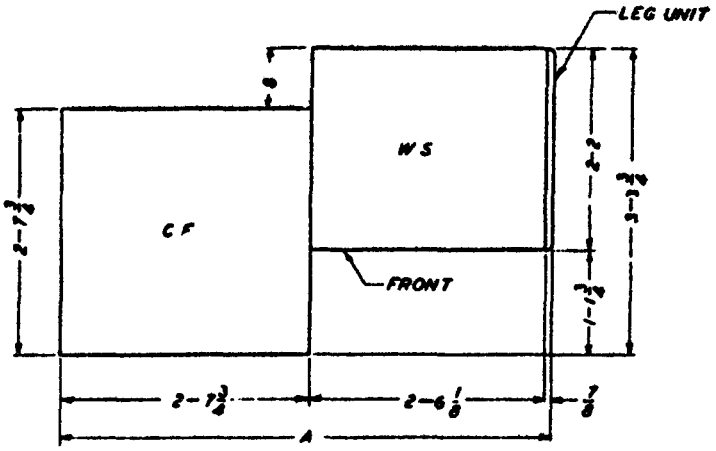
NOTES

1. When RR equipment is in place, the existing aux sig ckt SD90620-01 and flashing ckt SD90084-01 should be retained. When the RR equipment is to be furnished new, aux sig ckt SD95735-01 and flashing ckt SD95725-01 are recommended. These ckts serve both the RSD & LTD. New and old circuits should not be mixed in the same test center.

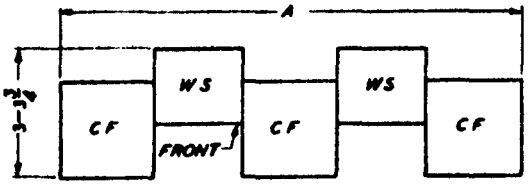
2. The Light Load Turret when mounted on J94801A should be wired per SD90044-01 and when mounted on J94801B should be wired per SD95717-01.



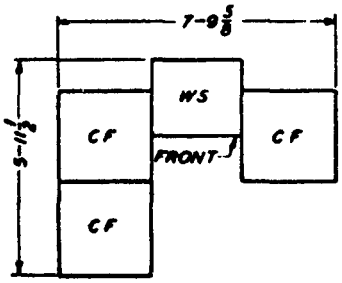
FLOOR PLAN CONVENTION
FIG 1



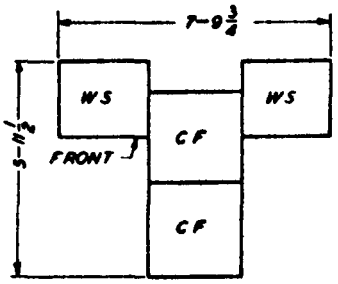
FLOOR PLAN DETAILS OF 1 CARD FILE & 1 WRITING SHELF
FIG 2



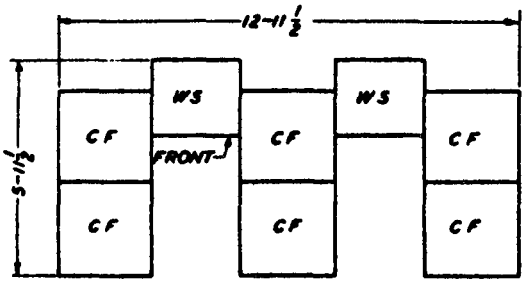
TYPICAL ARRANGEMENT
FIG 3



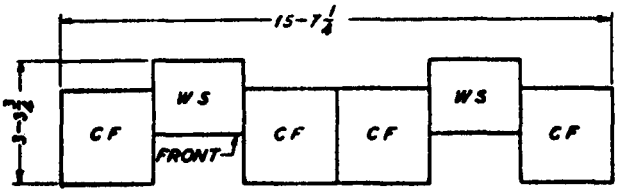
3 CARD FILES & 1 WRITING SHELF



2 CARD FILES & 2 WRITING SHELVES



6 CARD FILES & 2 WRITING SHELVES



4 CARD FILES & 2 WRITING SHELVES

ALTERNATE ARRANGEMENTS
FIG 4

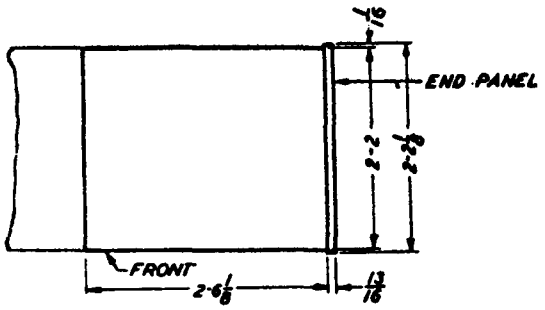
WEIGHT	
CARD FILE	WRITING SHELF
100	110

LENGTH OF LINE		
CF	WS	A
1	1	5-2 3/4
2	1	7-9 5/8
2	2	10-4 5/8
3	2	12-11 1/2
4	3	18-1 3/8

NOTES:
1. THE ARRANGEMENTS SHOWN IN FIGURES 3 & 4 ARE FOR ILLUSTRATION AND DO NOT REPRESENT ALL POSSIBLE COMBINATIONS.

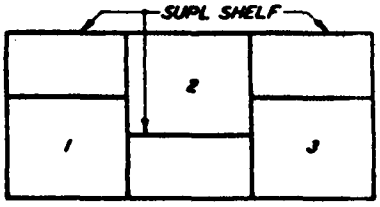
REPAIR SERVICE DESK NO 2 AND SINGLE SIDED LEG UNIT FOR SINGLE SIDED SUPPLEMENTARY DESK

FLOOR PLAN CONVENTION
FIG 1



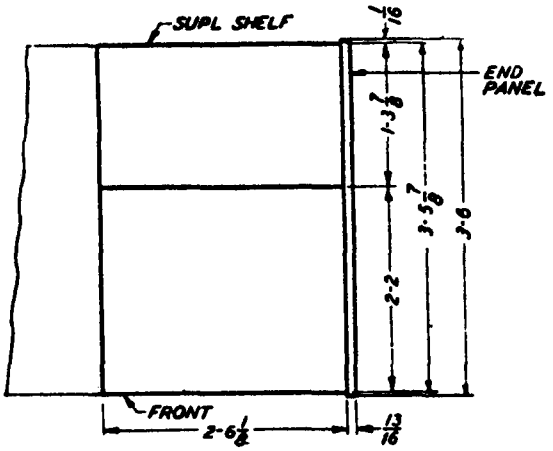
REPAIR SERVICE DESK NO 2 WITH SINGLE SIDED LEG UNIT FOR SINGLE SIDED SUPPLEMENTARY DESK

FLOOR PLAN DETAILS
FIG 2



REPAIR SERVICE DESK NO 2 WRITING SHELF AND DOUBLE SIDED LEG UNIT FOR DOUBLE SIDED SUPPLEMENTARY DESK

FLOOR PLAN CONVENTION
FIG 3



REPAIR SERVICE DESK NO 2 WRITING SHELF AND DOUBLE SIDED LEG UNIT FOR DOUBLE SIDED SUPPLEMENTARY DESK

FLOOR PLAN DETAILS
FIG 4

OVERALL LENGTH OF LINE	
DESKS IN LINE	LENGTH
2	5-1 7/8
3	7-8
4	10-2 1/8

Repair Service Desk arrangement showing 15 foot Retractile Cord, Part of 52D Head Telephone Set used in place of the regular 52A Head Telephone Set.

View of a 3 Position Repair Service Desk with 6 Card Compartment Assemblies.

View showing a single position Repair Service Desk serving two positions of Local Test Desk.

Typical Repair Service Position with two Card compartment assemblies.

B. FRAMEWORK AND EQUIPMENT

1. Writing Shelf

The writing shelf is of wood construction with a black fibre faced top 2'6" wide and 2'2" deep. A hinged keyshelf 6 3/4" wide is provided along the left hand side and contains the keys and lamps associated with the talking trunks. The drilling for the clock and dial is provided by the shop as shown on J94801B-1. For convenience in packing, the clock and dial are shipped separately and mounted by the installer. The front apron is 6" high and contains the operator's telephone jacks. The back panel is 10 7/8" deep and is hinged to provide access to the relay equipment and terminal strips. The writing shelf is supported by card compartment assemblies or leg assemblies.

2. Card Compartment Assembly

The card compartment assembly is shown on ED90196-30. It consists of a rectangular wooden tub approximately 2'-7 3/4" square by 10" deep and is supported on four legs. The tub is equipped with four separators and five card holder slides making five compartments for cards 6" wide. The number of compartments may be increased to 6, 7 or 8 for narrower cards by adding separators and slides, ordered separately. Various card lengths may be accommodated by adjusting the false bottom to the desired height. A compartment for trays of inactive cards is provided underneath the tub accessible through a door which may be faced in any of four directions. The trays for inactive cards are ordered separately. Screws are provided with the card compartment for fastening the writing shelf to the compartment assembly and the card compartment assembly to the floor.

3. Light Load Turret

The Light Load Turret equipment is shown on ED90166-10. The assembly is of wood construction and is shown on ED90166-31 and ED90167-31. The turret is available in two sizes: 30 and 90 trunk capacity.

Demensions:	30 Trk Cap.	90 Trk Cap.
Width	1'-5"	1'-7 1/2"
Depth	8"	1'-0"
Height	9 5/8"	1'-11"

The keys and lamps are mounted in the front panel facing the operator. The back of the turret is removable to provide access to the wiring.

4. Finish

All exposed woodwork is given a medium mahogany finish on Birch wood. The top surface of the writing shelf is faced with dull black phenol fibre.

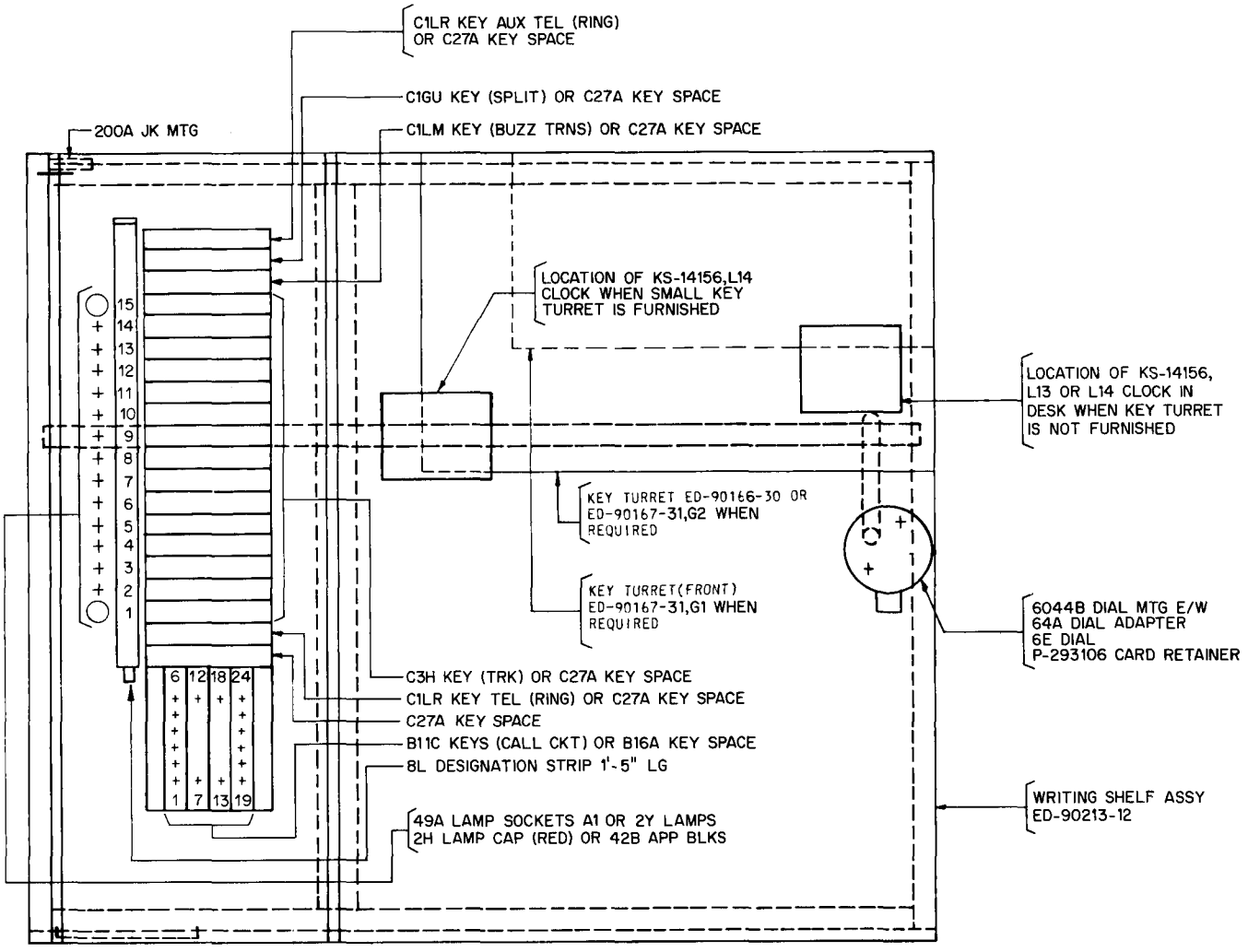
5. Cabling

The switchboard cables are connected to the terminal strip in the back of the writing shelf entering through a cable hole in the bottom. ED90191-01 shows a typical cabling plan.

6. Cable Protection Panel

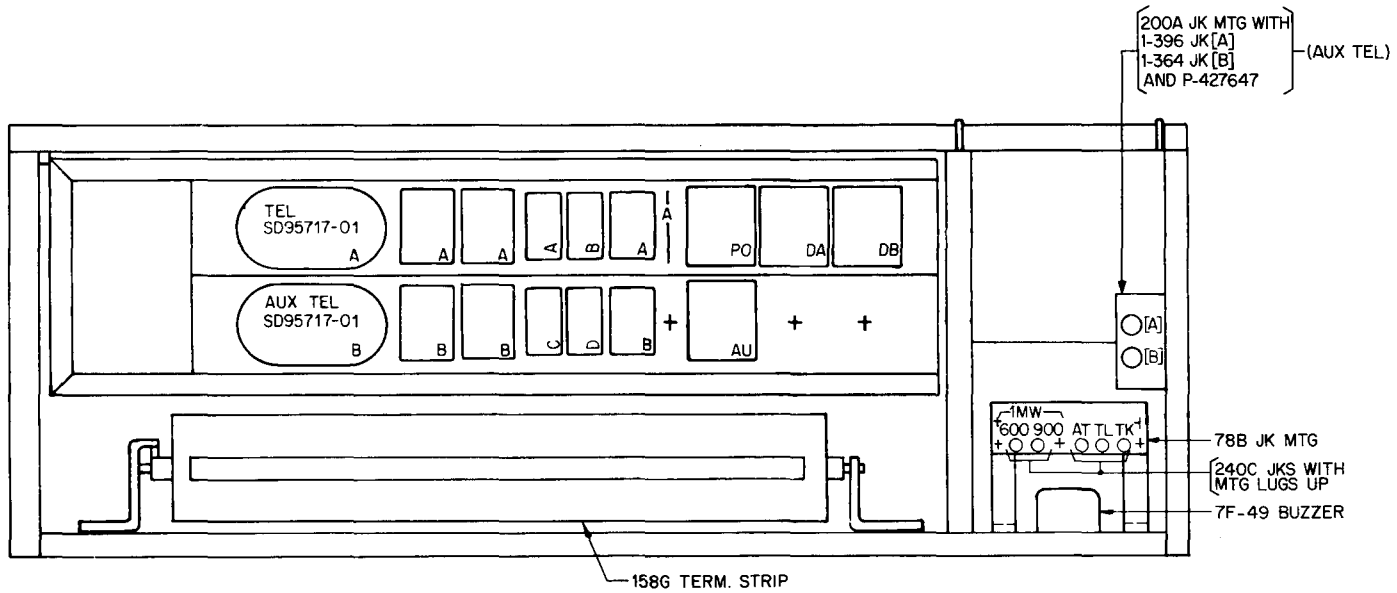
A cable protection panel shown on ED90685-30 is provided to cover the cabling when run under the desk on cable brackets furnished with the writing shelf. The cable protection panels are ordered separately.

NO. 2 REPAIR SERVICE DESK
(WRITING SHELF)


C1LR KEY AUX TEL (RING) OR C27A KEY SPACE
C1GU KEY (SPLIT) OR C27A KEY SPACE
C1LM KEY (BUZZ TRNS) OR C27A KEY SPACE
200A JK MTG
LOCATION OF KS-14156,L14 CLOCK WHEN SMALL KEY TURRET IS FURNISHED
LOCATION OF KS-14156, L13 OR L14 CLOCK IN DESK WHEN KEY TURRET IS NOT FURNISHED
KEY TURRET ED-90166-30 OR ED-90167-31,G2 WHEN REQUIRED
KEY TURRET(FRONT) ED-90167-31,G1 WHEN REQUIRED
6044B DIAL MTG E/W
64A DIAL ADAPTER
6E DIAL
P-293106 CARD RETAINER
C3H KEY (TRK) OR C27A KEY SPACE
C1LR KEY TEL (RING) OR C27A KEY SPACE
C27A KEY SPACE
B11C KEYS (CALL CKT) OR B16A KEY SPACE
8L DESIGNATION STRIP 1'-5" LG
WRITING SHELF ASSY ED-90213-12
49A LAMP SOCKETS A1 OR 2Y LAMPS
2H LAMP CAP (RED) OR 42B APP BLKS

PLAN VIEW

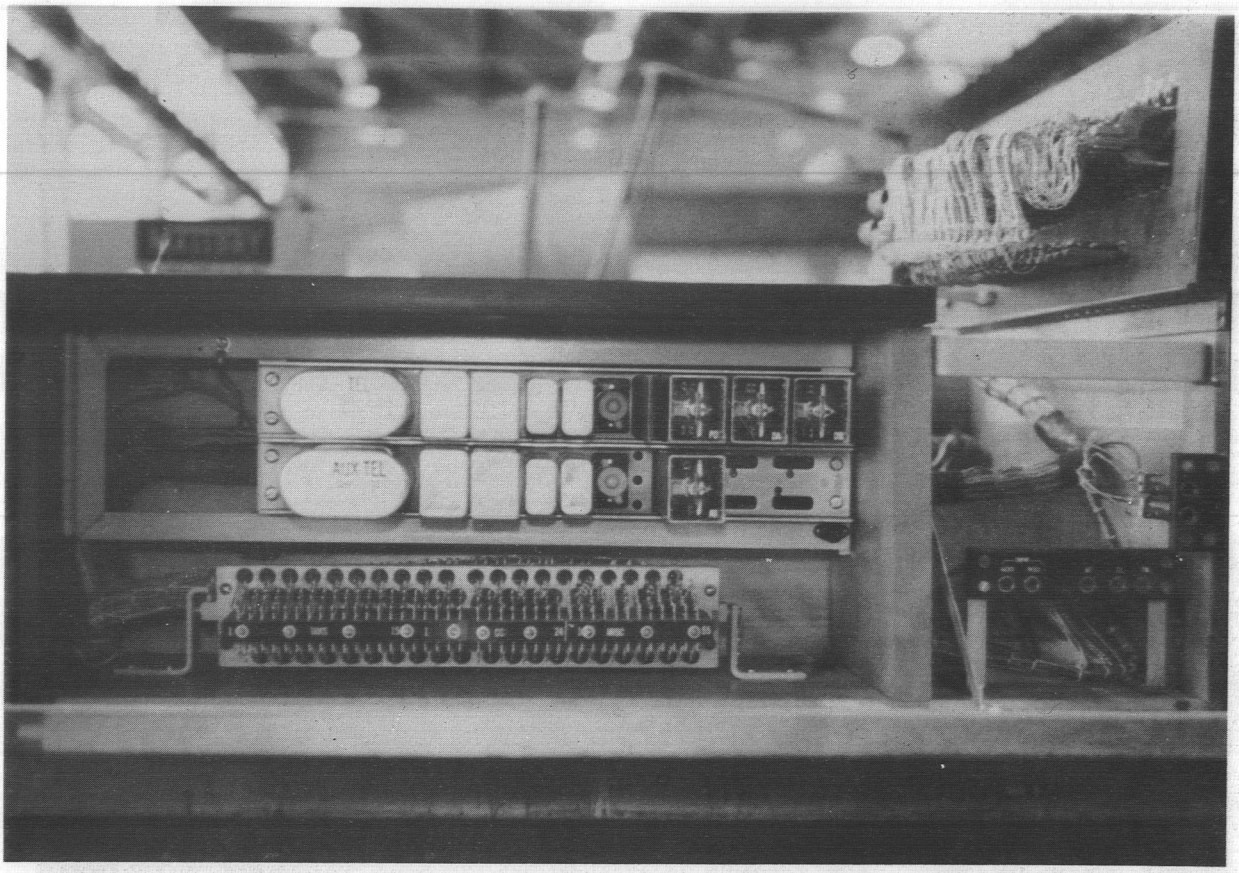
FIG. 1



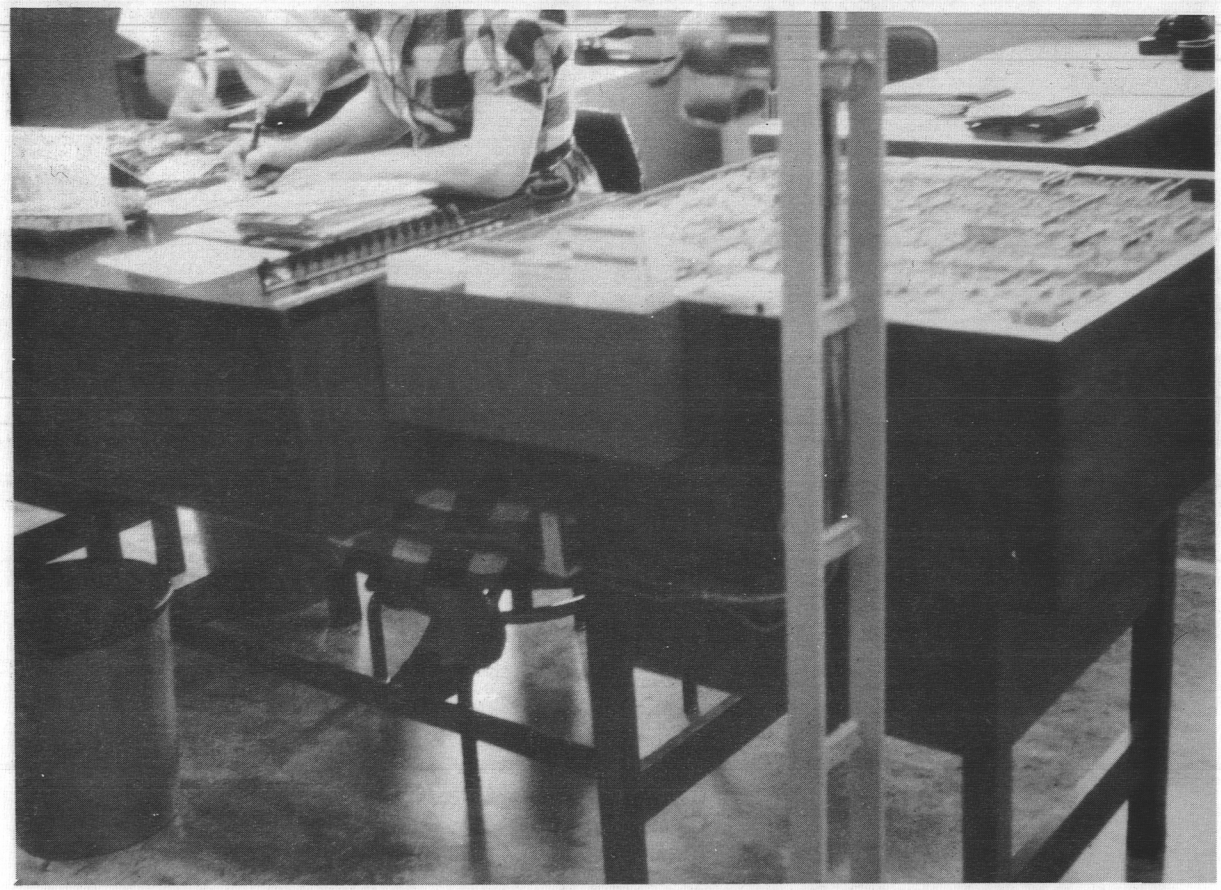
REAR EQUIPMENT OF DESK
DOOR REMOVED

FIG. 2

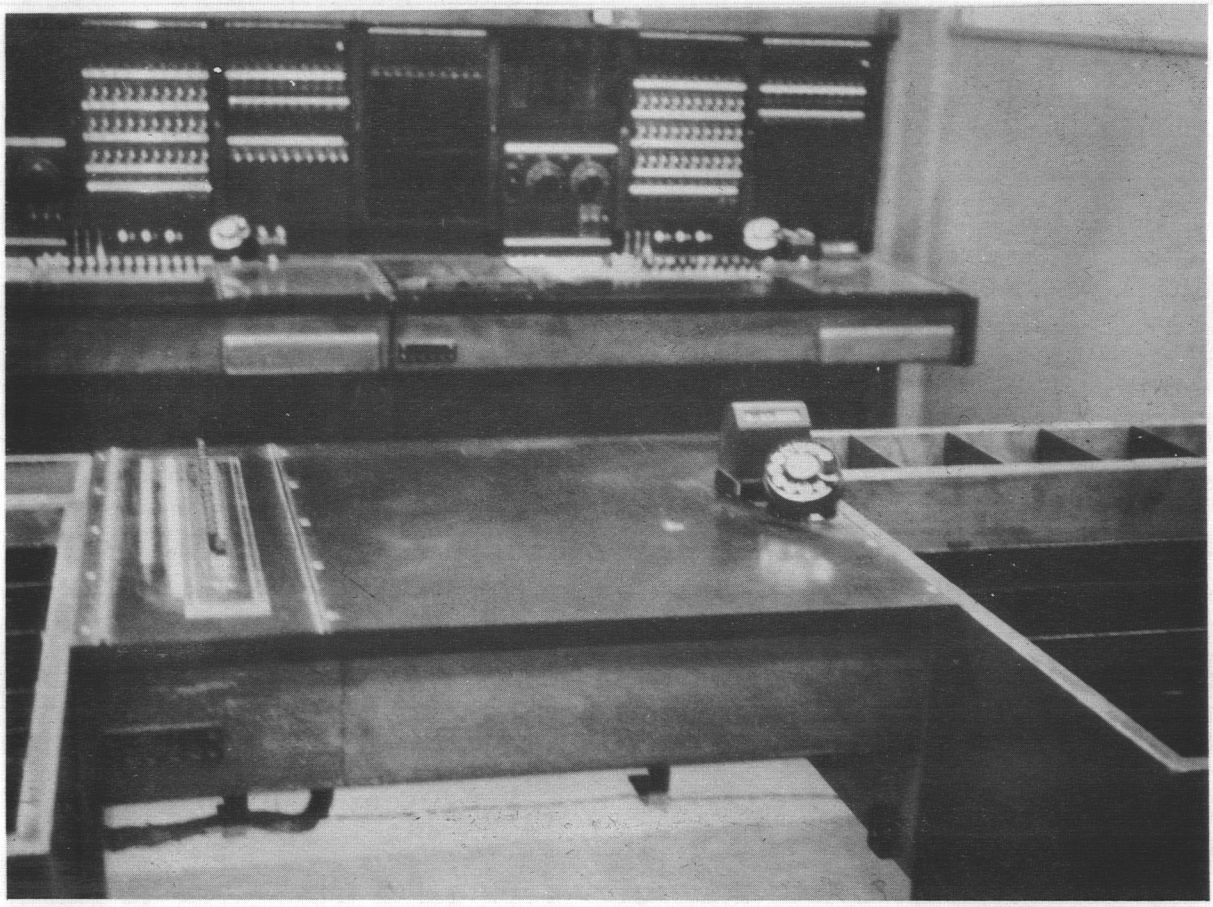
Rear view of RSD writing shelf in process of manufacture
Key shelf and rear door open showing access to equipment



Rear view of writing shelf showing relay equipment terminal strip, transmission test jacks and auxiliary operators tel jacks at right. Cut out in rear door exposes auxiliary operators telephone jacks when closed.



View showing card compartment assembly cabling and foot rail.



Partially installed writing shelf supported by two card compartments.
The supplementary card boxes at rear of compartments are non standard.

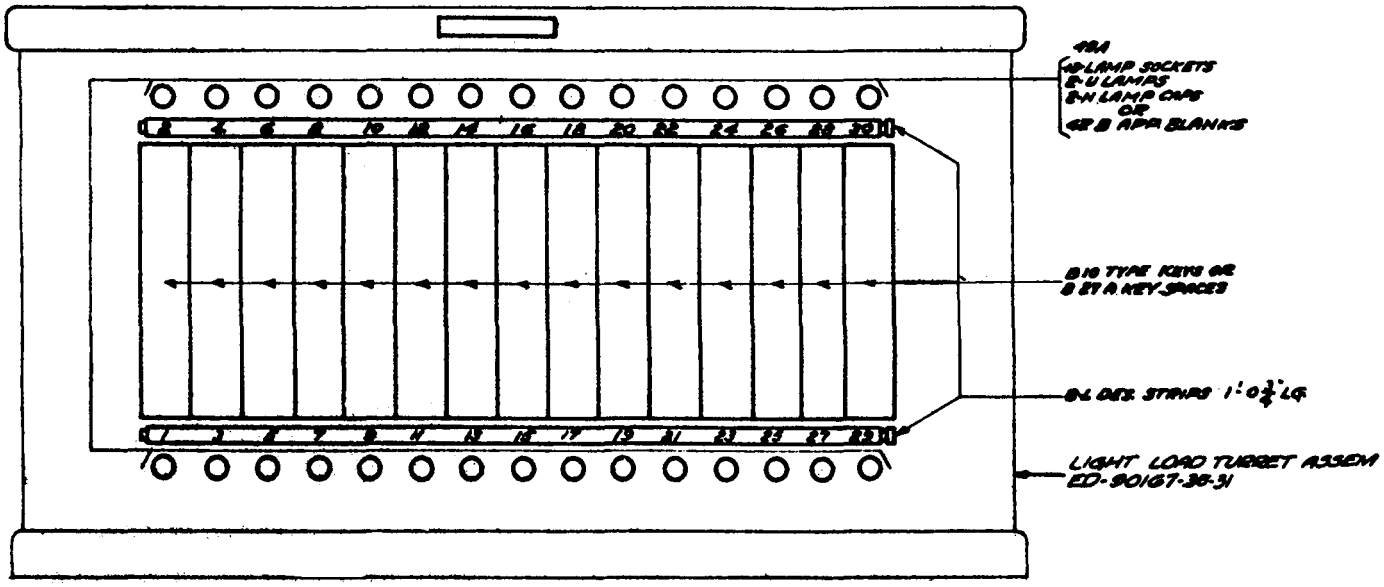


FIG. 1
FRONT VIEW OF TURRET
CAPACITY 30 TRUNKS

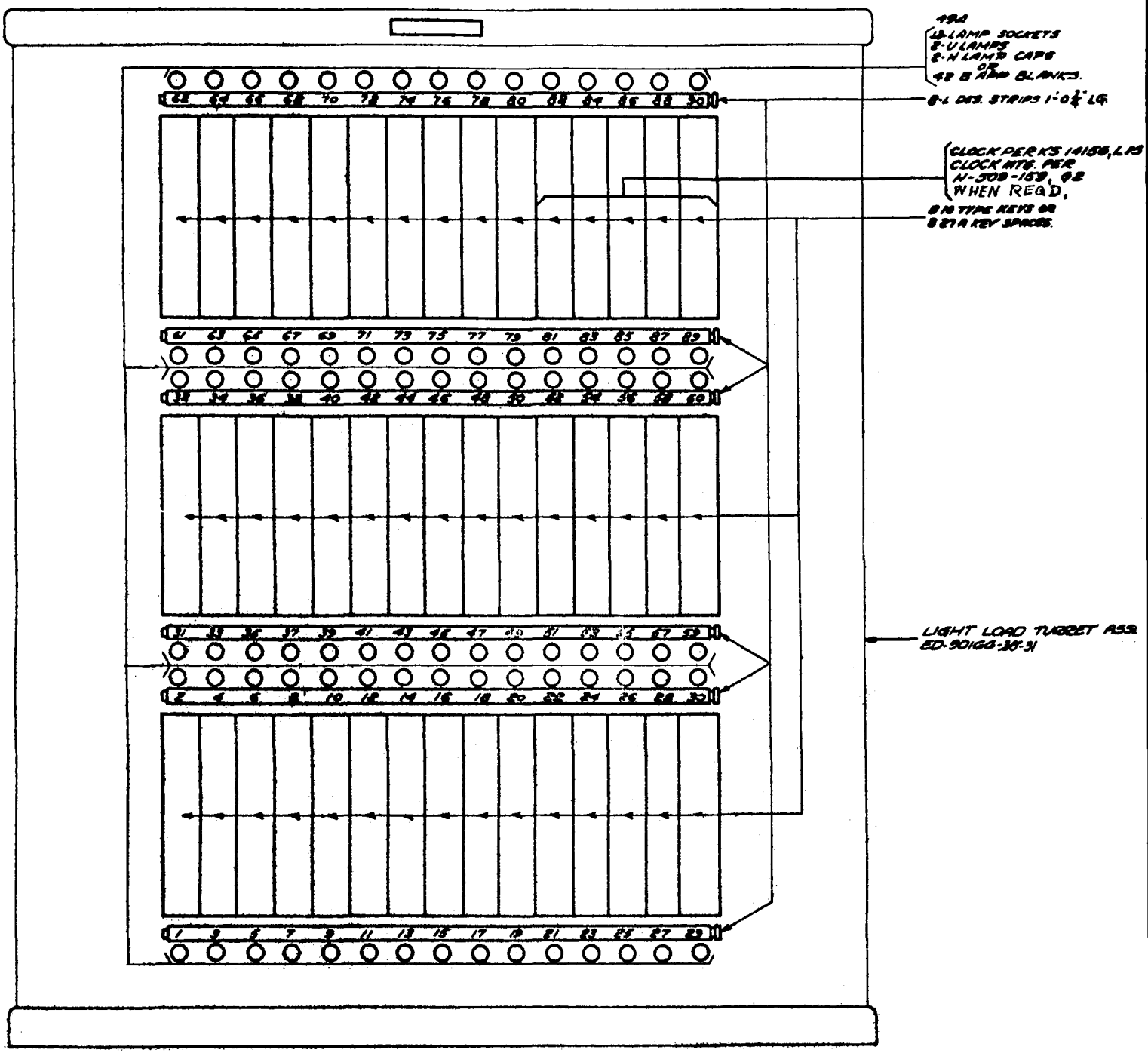


FIG. 2
FRONT VIEW OF TURRET
CAPACITY 80 TRUNKS

C. CIRCUIT FEATURES

1. Telephone Circuit

Complete List of Telephone Circuits for the No. 2 RSD

Title	Circuit	Rating	Equipment	Rating	Relays	Lamps	Trans-mission
Tel	SD90044-01	* A&M only	J94801A	MD	24V	24V	48V
Aux Tel	SD90225-01	MD	J94801A J93016AN	MD	24V	24V	48V
Tel & Aux Tel	SD95717-01	STD	J94801B	STD	48V	24V or 48V	48V

* "A&M Only" for Light Load Turret, otherwise "Mfr Disc"

The telephone circuit provides the talking, dialing and ringing facilities for the repair service desk and includes the following features:

1.01 Trunk Key and Lamp Circuit

This circuit consists of a key and a lamp for each trunk circuit. The lamp flashes on an incoming call and lights steady when the key is operated in answering or originating a call. The key has three positions: Normal, Talk and Hold. In the "Talk" position, the trunk circuit is connected to the operator's telephone circuit. In the "Hold" position, the trunk is disconnected from the telephone circuit but held leaving the operator free to talk on another line and return to the call later. Some connecting trunk circuits such as SD96221-01 have an optional electrical hold feature. The electrical hold feature is not used in the Local Test Center. Fifteen (15) trunk key and lamp circuits are wired in each Repair Service position.

The T, R, K and L leads may be cabled individually from each position to the distributing frame for cross-connection to the trunks and tie lines, or cabled from the first position only and multipled between the positions at the terminal strips in the desk. For connecting circuits see Section 5.

1.02 Splitting Key Circuit

A splitting key is provided when specified by the Telephone Company to facilitate handling heavy traffic during the busy hours. When this key is normal, all of the 15 trunks of the position are associated with the telephone circuit of the regular operator seated at the front of the position. When the splitting key is operated, trunk circuits 1 to 8 will be connected to the regular operator as before and trunk circuits 9 to 15 will be associated with the telephone circuit of an auxiliary operator seated at the rear of the position.

1.03 Auxiliary Telephone Circuit

The auxiliary telephone circuit provides the auxiliary operator with facilities for talking on trunk circuits 9 to 15 when the splitting key is operated. It is connected to telephone jacks located in the rear of the position. No dialing is provided in the auxiliary telephone circuit.

Auxiliary telephone circuit SD90225-01 is used with telephone circuit SD90044-01 and the relay equipment is located on the relay rack.

Telephone circuit SD95717-01 includes the auxiliary telephone circuit and the relay equipment is located inside the writing shelf J94801B.

1.04 Ringing Circuit

The ringing key is required only when outgoing ringdown trunks are provided. When required, one ringing key is provided for the regular operator and one for the auxiliary operator.

1.05 Outgoing Call Circuits

Twenty-four (24) outgoing call circuits are wired in the writing shelf and equipped in groups of six (6) as required. Operation of a call circuit key connects the telephone circuit directly to the operator's telephone circuit of another desk or a switchboard.

Unengraved red-orange key buttons are provided with the call circuit keys. When engraved buttons are required, they are ordered separately and the blank buttons are replaced by the engraved buttons in the field. (For Engraving See A108.226 and EE Handbook Section 3)

1.06 Incoming Call Circuits

Taps are provided in the telephone circuit for cross-connection at the distributing frame to the outgoing call circuits of other desks and switchboards.

1.07 Monitoring Taps

Monitoring taps are provided for cross-connection at the distributing frame to monitoring jacks in the Test Supervisor's Private Desk or Supervisory and Light Load Position.

1.08 Service Observing

Terminations are provided at the distributing frame for cross-connecting the telephone circuit to service observing desk circuits as required.

1.09 Transmission Testing (J94801B Only)

Jacks are provided for connecting into the regular and auxiliary telephone circuits for transmission testing.

1.10 Light Load Turret

A light load turret containing a multiple of the key and lamp circuits of all other positions in the lineup may be mounted on a light load position so that one operator may answer any trunk circuit during periods of light load.

Two sizes of light load turrets are available, one 30 trunk capacity and one 90 trunk capacity.

When mounted on a writing shelf per J94801A, the turret keys should be wired per T90044-12 and when mounted on a desk per J94801B, the turret keys should be wired per T95717-12.

The splitting key should not be provided in the same position with the light load turret since the turret blocks the auxiliary operator.

1.11 Multiple of Repair Service Trunks in LTD

In some installations it may be desirable for the repair service operator to call a test desk man in on a repair service trunk or for the test desk man to answer a repair service call in the absence of the repair service operator, in which case, a multiple of the repair service trunks is provided in the local test desk. The regular key ended trunks in the test desk may be used for this purpose when available. Jack ended talking trunks may be provided for this multiple where insufficient keys are available or where it is desired to distinguish this multiple.

2. Clock Circuit

2.01 Synchronous Clock

A motor driven clock operating on 22 V AC derived from the 60 cycle commercial power supply is available for each position. This clock may be surface mounted or flush mounted as required.

2.02 Impulse Clock

A 1A electric clock driven by a master clock or 10 IPM circuit may be provided for additions to a lineup where this clock is in use.

The clock is located as follows:

Behind the Dial	-	No Turret Provided
At Left of Turret	-	Small Turret Provided
In Turret	-	Large Turret Provided

3. Transmission Test Circuit (J94801B Only)

1 MW 600 ohm and 900 ohm, 1000 cycle supply jacks are provided in the rear of the writing shelf and are equipped as required. These jacks are cabled to the transmission test circuit and are for making transmission measurements.

4. Auxiliary Signal and Flashing Circuits

The auxiliary signal and flashing circuits should be compatible with those of the Local Test Desk. When auxiliary signal circuit SD90628-01 is used in the LTD, auxiliary signal circuit SD90620-01 should be provided in the Repair Service Desk with flashing circuit SD90084-01.

When auxiliary signal circuit SD95735-01 is used in the LTD, SD95735-01 should also be provided in the Repair Service Desk with flashing circuit SD95725-01.

For description and compatibility, See Section II-E-9.

5. Framework Ground

The Repair Service Desk is grounded by means of a #12 A W G wire run on the cable rack to the fuse bay ground panel or PRTD frame as shown on the telephone circuit wiring diagram.

6. Repair Service Trunks

See Section V "Talking Facilities"

6.01 Service Observing on Trunk Circuits

Repair service trunks may be connected to the service observing desk by the connection of a shoe or plug to the terminal strip of the trunk circuit at the distributing frame.

6.02 Repair Service Observing Recorder

(N.Y. Tel. Co. Dwg. PC1869 See PEL 6557)

This circuit is used by some companies for observing on repair service trunks. Each repair service trunk circuit to be observed is cross-connected through this circuit and the conversations are recorded on a Gray Audograph Recorder on a sampling basis.

D. SPECIAL ADAPTATIONS

1. Call Director Sets for Repair Service

Some Telephone Companies prefer to use Call Director Telephone sets or 101A Key equipment on flat top commercial desks for handling repair service calls instead of the writing shelf described herein.

These sets are station apparatus and are furnished and installed by the Telephone Company. Modifications are required in the call director sets to make them compatible with the repair service trunks, to which they are cross-connected. This modification is the responsibility of the Telephone Company. No Western Electric Company drawings are available for this arrangement. The No. 20 or No. 21 key cabinet may also be used for this purpose.

2. Rotary Files

Acme Rotary Files or commercial steel card tubs are used by some Telephone Companies in place of the Western Electric Company wooden card file described herein. These files are usually provided by the Telephone Company but may be furnished by the Western Electric Company on a job basis.

Repair service operator with call director set on a commercial desk. LIT teletypewriter in background.

Call director set on commercial desk used for repair service with W.E.Co. card compartment assemblies in foreground.

SECTION IV

TEST SUPERVISOR'S PRIVATE DESK

		PAGE
A.	General	189
B.	Framework	189
C.	Equipment	190
D.	Cabling	190
E.	Circuit Features	190
	1. Telephone Circuit	191
	2. Trunk Key and Lamp Circuits	191
	3. Monitoring Circuits	191
	4. Grouping Key Circuit	192
	5. Clock Circuit	192
	6. Auxiliary Signal and Flashing Circuits	192
	7. Framework Ground	192
F.	Illustrations	193

SECTION IV

TEST SUPERVISOR'S PRIVATE DESK

A. General

The Test Supervisor's Private Desk is used in large local test centers to provide talking trunk, tie line and monitoring facilities for the test supervisor.

It consists of a single sided turret mounted on a commercial flat top desk and contains the following circuits:

Quan.	Circuit
40	Monitoring Jack Circuits
8	Trunks or Tie Lines
1	Telephone Circuit
1	Grouping Circuit
1	Buzzer Circuit

A hangup type telephone set is provided on the side of the desk for talking and monitoring.

A Synchronous clock may be mounted on the desk adjacent to the turret when required.

B. Framework

The turret assembly, shown on ED90050-12, is of wood construction 1'-5 1/4" wide, 1'-3 3/8" deep and 1'-6 3/8" high. The front panel contains the jacks, keys and lamps and is hinged at the bottom to provide access to the wiring. Mounting brackets are provided inside the cabinet to support the mounting plates and terminal strips. The cover, consisting of top, back and sides, is fastened to the base by means of captive screws and is removeable to provide access to the relay equipment.

C. Equipment

The following is a complete list of equipment specification drawings for the Test Supervisor's Private Desk:

Drawing	Rating	Equipment
J94703A-1	MD	Turret & Eqpt
* J94703A-2	MD	" "
* J94703A-3	MD	" "
* J94703A-4	MD	" "
J94703B-1	STD	Turret
J94703C-1	STD	Rear Eqpt for B-1

* J94703A-2 was renumbered A-3 and A-3 was renumbered A-4.

D. Cabling

The method of cabling is shown on the Typical Cabling Plan, ED92880-01.

E. Circuit Features

The following is a complete list of circuit drawings for the Test Supervisor's Private Desk:

Circuit	Rating	Equipment	Rating
SD90075-01	MD	J94703A-1	MD
		A-2	MD
		A-3	MD
		A-4	MD
SD95722-01	STD	J94703B-1	STD
		C-1	STD

1. Telephone Circuit

The telephone circuit provides talking, monitoring and dialing facilities for the desk using a hangup type handset.

SD90075-01 is designed with 24 volt lamps, relays and transmission and can only be used in offices where 24V supply is available.

SD95722-01 is designed with 24V or 48V lamps and 48V relays and transmission and may be used in any type of office.

2. Trunk Key and Lamp Circuits

Eight key and lamp circuits are available for cross-connection to talking trunks and tie lines.

When telephone circuit SD90075-01 is provided, the connecting circuits such as two-way trunk circuit SD96221-01 and transfer circuit SD90041-01 or SD95726-01 must be equipped with a 24V relay in the "K" lead. Otherwise there is a possible path to 24V over the "K" lead through relays in the telephone circuit when the receiver is in the "on hook" position; this would cause the relays to lock up.

Where key and lamp circuit SD95722-01 is used, the "K" lead of the trunk key connects to direct ground and either 24V or 48V relays may be used in the "K" lead of the connecting circuits.

3. Monitoring Circuits

The monitoring jack circuits appear in the jack field and are connected to the monitoring taps of the operator's telephone circuits to be monitored. Monitoring is accomplished by patching the monitoring cord to the jack and operating the monitoring key in the telephone circuit.

4. Grouping Key Circuit

Grouping key circuit SD96221-01 Figure 2 is used to connect the trunks in the Test Supervisor's Desk to the trunks of the Supervisory and light load position of the Local Test Desk when the Test Supervisor's Desk is unattended. It is located in place of the 8th trunk key and lamp circuit.

5. Clock Circuit

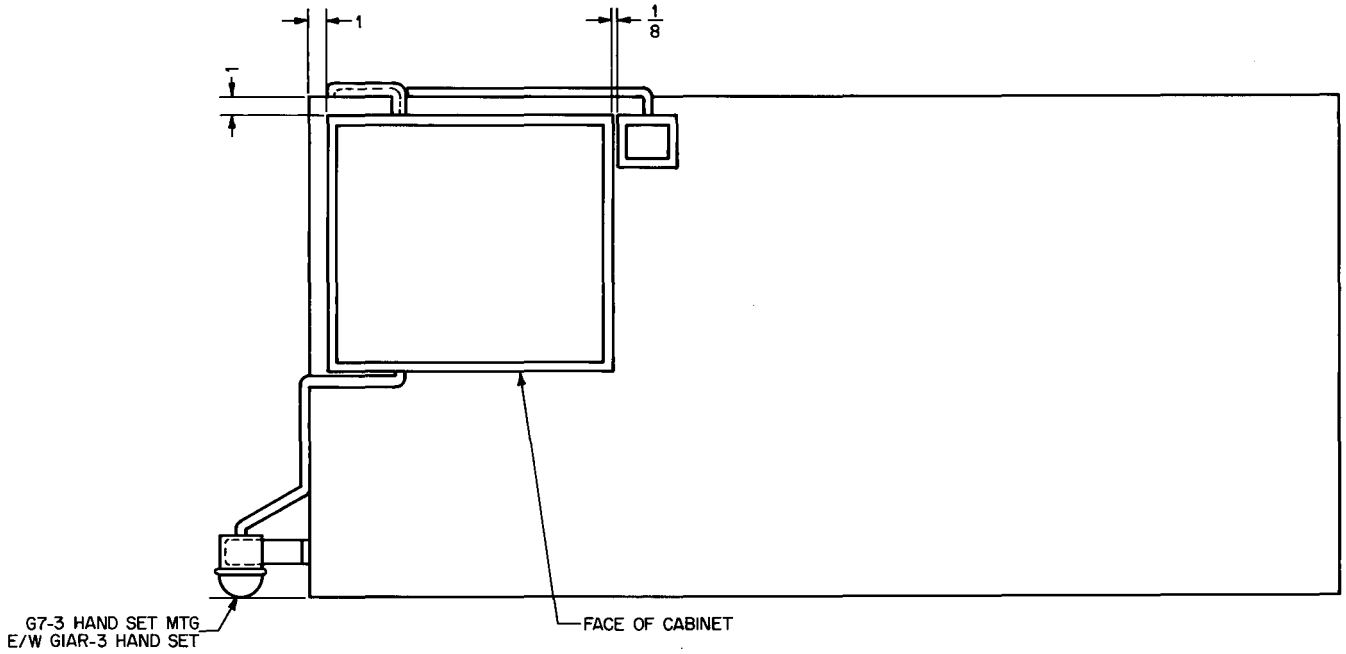
A surface mounted synchronous clock SD95012-01 may be mounted on the desk adjacent to the turret when required.

6. Auxiliary Signal and Flashing Circuit

The auxiliary signal and flashing circuits should correspond with those of the Local Test Desk and Repair Service Desk. Where auxiliary signal circuit SD90620-01 and flashing circuit SD90084-01 are used in the Repair Service Desk, the same circuits should be used in the Test Supervisor's Private Desk. Where auxiliary signal circuit SD95735-01 and flashing circuit SD95725-01 are used in the Local Test Desk, they should also be used in this desk.

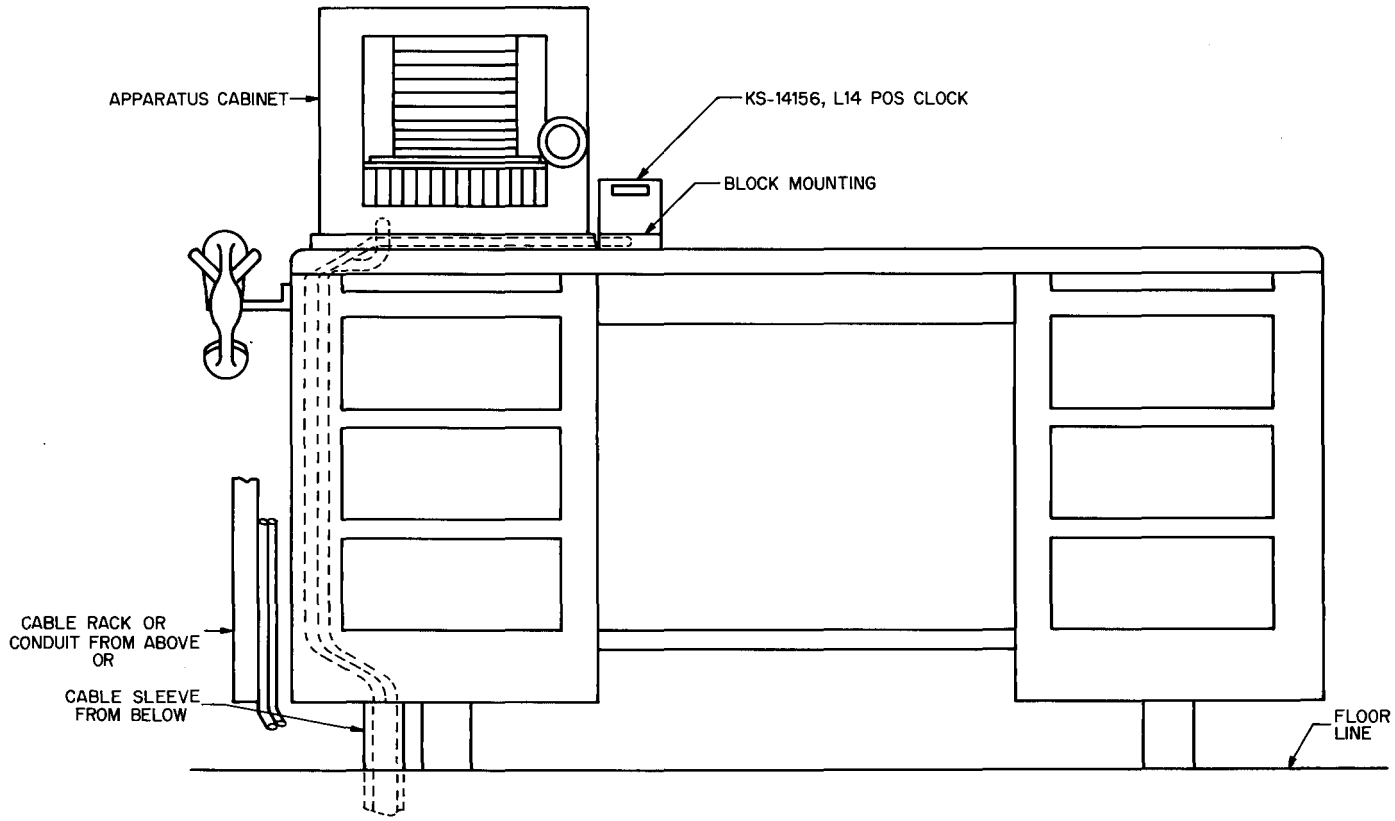
7. Framework Ground

Framework ground is provided by a No. 12 A.W.G. wire connecting a ground terminal on the framework of the turret to a ground bar on the fuse bay or PRTD frame as shown on the telephone circuit wiring diagram.



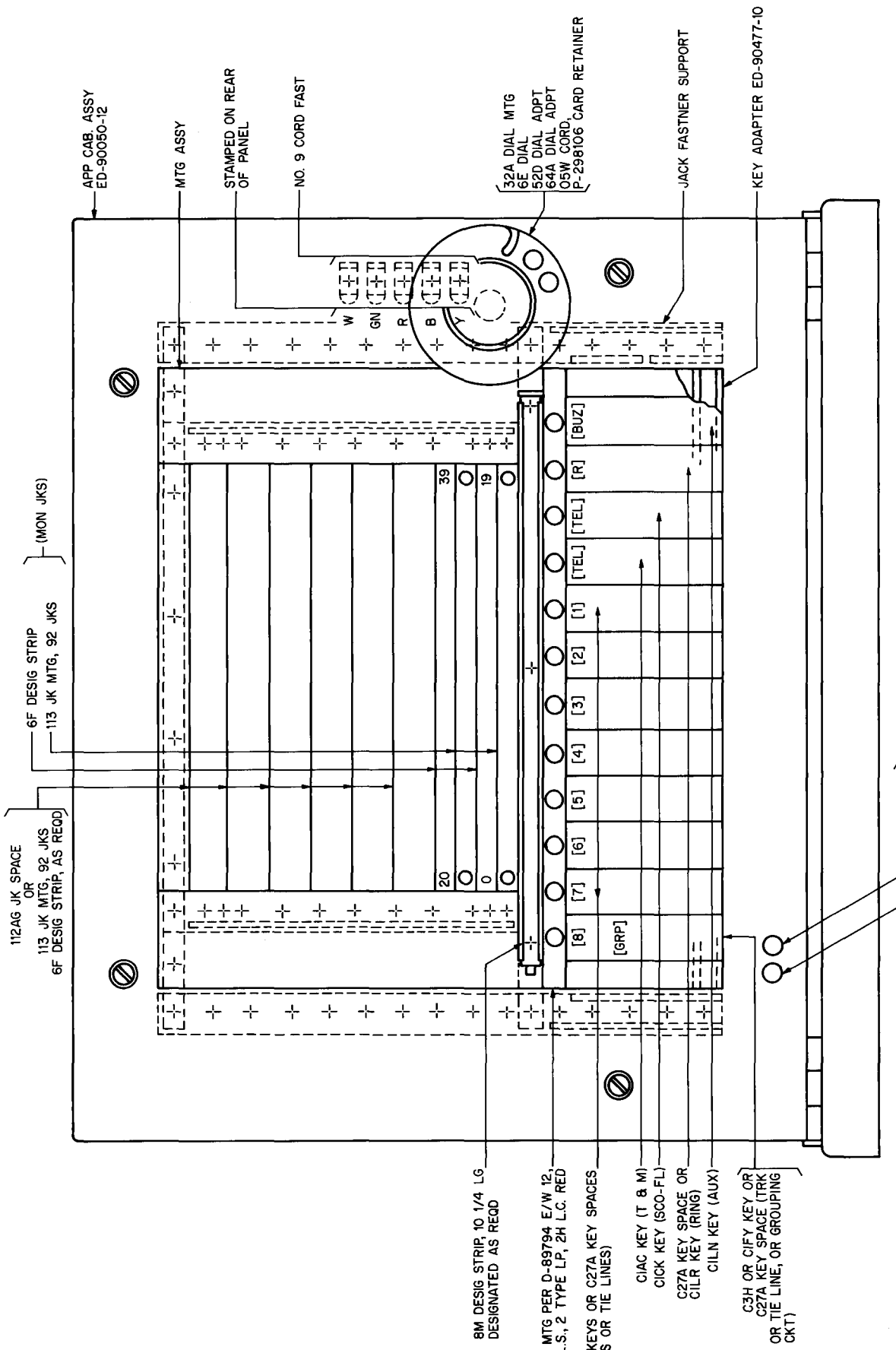
LOCATION OF CABINET, CLOCK AND HAND SET MTG
DIMENSIONS SHOWN ARE TYPICAL FOR METAL,
60" X 30" COMMERCIAL TYPE DESKS.

PLAN VIEW



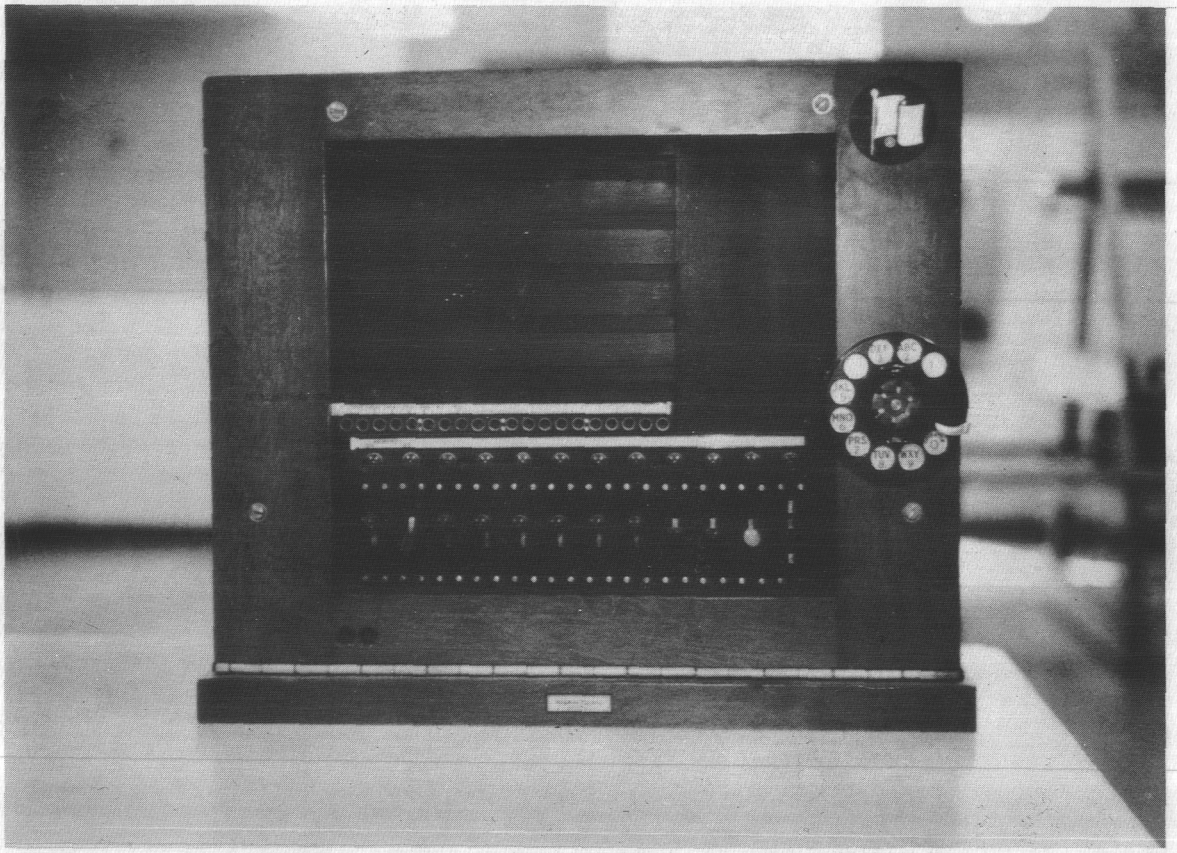
METHOD OF CABLING SINGLE
SIDED DOUBLE PEDESTAL DESKS

FRONT VIEW



FRONT VIEW

TEST SUPERVISORS PRIVATE DESK



Test Supervisor's Private Desk showing talking trunks and 20 monitoring jacks.

Typical Test Supervisor's Private Desk

SECTION V

TALKING FACILITIES FOR MAINTENANCE

		PAGE
A.	List of Circuits	197
B.	Notes and Definitions	198
C.	Application Sketches	202

SECTION V

A. TALKING FACILITIES COMMON TO MAINTENANCE DESKS AND TEST FRAMES

Circuit	Description	Page
SD95405-01	2-Way 2W Auto Trk	202
SD95406-01	Auto Tie Line 3W Trk	202
SD95409-01	Loc Station Line	202
SD95539-01	Trans of 2-Way Trk to #12 Swbd	204
SD95594-01	Trns & Lamp Rel	202
SD95615-01	958 Trk (Terminating)	-
SD95617-01	958 Trk (Originating)	-
SD95706-01	Inc Auto Trk from SXS Sel Mult	205
SD95736-01	Trans of 2-Way Trk to "A" Swbd	204
SD95727-01	Trans of Inc or 2-Way Trk to "A" Swbd	204
SD95728-01	Trans of Inc Trk to Toll Swbd	204
SD95729-01	Trans of 2-Way Trk to Toll Swbd	204
SD95730-01	Inc Auto Trk	205
SD95731-01	Auto Inc or 2-Way Trk from "A" Swbd	203
SD95732-01	Auto Inc or 2-Way Trk from Toll Swbd	203
SD95733-01	Inc Auto OG Ringdown Trk from Toll Off	203
SD95734-01	Talk Trk to MDF or RR	203
SD95782-01	Inc Trk to RSD - Loop Sig, High-Low Supv.	205
SD96074-01	Talk Trk to MDF or RR Frame End	203
SD96211-01	2-Way Trk Inc RD OG Auto	203
SD96487-01	Inc Trk to RSD - E&M Lead Sig.	207

B. Notes and Definitions

1. Hold

a. Locking Key Hold

The mechanical locking hold key permits the operator to hold one trunk while talking on another and return to the original trunk later. In the mechanical hold position, this key short circuits the tip and ring leads and maintains ground on the "K" lead of the trunk.

All trunk key and lamp circuits of the Local Test Center are provided with mechanical locking type hold keys. Most test frames however, have some keys with and some without the mechanical locking hold key position.

b. Electrical Hold

The electrical hold feature is provided in certain trunks such as SD96221-01 and is used where it is necessary to hold the trunk at one location until it is picked up at another location.

For example: A switchman may receive a call at his desk and find it necessary to make a test from a test frame where a multiple of the trunk appears. He may momemtarily operate the non-locking electrical hold key and restore the trunk key to normal. The trunk lamp will remain lighted steady (busy). The call may then be picked up at the other location by operation of the corresponding trunk key, and the control of the call will be transferred to that location.

This feature requires an "electrical hold key" sometimes called a "non-locking hold key" or "position hold key" which is provided once per position.

The electrical hold feature is not used in the Local Test Center and no electrical hold key is provided in the Local Test Desk, Repair Service Desk or Test Supervisor's Private Desk.

2. 24V vs 48V on "K" Lead

In some of the older circuits such as the Test Supervisor's Private Desk Telephone Circuit SD90075-01 and Transfer Circuit SD90041-01, under certain conditions, ground is removed from the "K" lead leaving a path from the "K" lead to 24V battery. Trunk circuits connected to these circuits must have the same battery voltage on the winding of the "K" relay as that of the associated circuit in order to prevent the relays from locking up.

This does not apply to the later telephone and transfer circuits in the SD95000- series which provide only solid ground or open on the "K" lead. The 48V option is generally provided in the connecting trunk circuit in all cases for these applications.

3. Flashing vs Steady Lamp

Two types of supervision are provided for talking trunks:

a. Steady lamp supervision which provides a steady lamp on incoming calls and no lamp when the call is answered. This is used in operating room desks or where a multiple of the trunk does not appear at any other location.

b. Flashing lamp supervision which provides a flashing lamp on incoming calls and a steady lamp (busy indication) when the call is answered. This is generally used in maintenance desks and test frames since a multiple of the trunk may appear in other positions.

4. Busy Lamp, regardless of transfer, means that a busy signal will appear at the desk when the trunk is in use even when transferred.

5. Busy Lamp, except when transferred, means that no lamp signal will appear at the desk when the trunk is transferred.

6. Line Lamp Lock In

On incoming calls to ringdown trunks, the (R) relay operates from ringing current, causes the trunk lamp to flash and locks to ground on its make contact. Two locking conditions are available.

a. Line Lamp Locked in at Any Time

This feature provides solid lockup ground to the (R) relay and the incoming lamp signal can then be retired only by the operation of the trunk key. This feature is used only where the associated desk is fully attended such as in an operating room desk or a chief switchman's desk in a fully attended office. This option should not be provided in a local test center which is generally unattended at night, since the trunk lamp would flash indefinitely until the trunk key is operated, even though the calling party has hung up.

b. Line Lamp Locked in Except when Transferred or Controlled by an Alarm Circuit, Alarm Transfer Circuit or Alarm Sending Circuit.

This feature places the (R) relay locking ground (LU lead) under control of a contact of a relay in the transfer circuit or a key in the alarm circuit.

Operation of the transfer key when the operator leaves the desk or the alarm transfer key when the maintenance man leaves the building removes ground from the LU lead, preventing the (R) relay from locking up, thus allowing the trunk lamp to flash only momentarily during the ringing interval on incoming calls.

7. Repair Service Trunks

Continuous service must be provided for directory advertised Repair Service Codes. Since most Repair Service Desks are unattended at night, some of these trunks are transferred to a switchboard or night operator and others are made busy. The quantities of each depends upon the amount of night traffic and is determined by the Telephone Company. Repair Service numbers are generally assigned in a 3 digit service code series, however, 7 digit Repair Service Codes are also standard. Transfer arrangements for 7 digit codes are handled on a job basis.

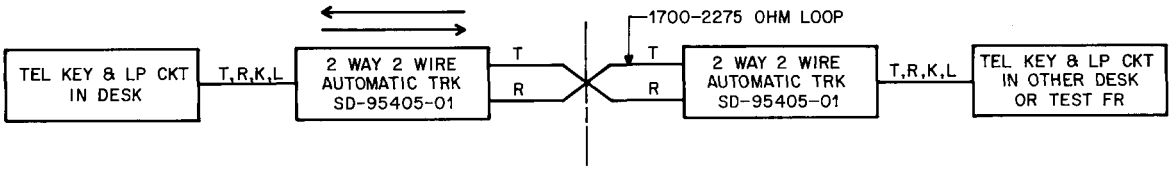
Unadvertised numbers such as those used by the maintenance force are not normally transferred or made busy.

8. Remote Repair Service Trunk

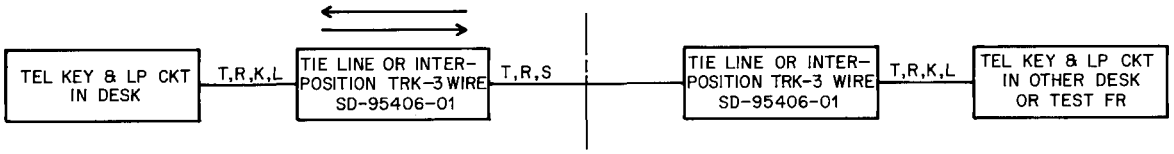
A repair service trunk for offices arranged for "Remote Testing" is under development by the Bell Laboratories. The proposed circuit will be arranged to transfer a repair service call to a distant location by repetory dialing over the regular telephone facilities. The transfer will be controlled by a timer which can be programmed, for example, to transfer to one location at 5:00 O'clock and to another location at 9:00 O'clock when the former shuts down, etc. and back to the local desk in the morning.

The following diagrams show typical trunk and tie line facilities which may be used with the No. 14 Local Test Desk, No. 2 Repair Service Desk, Test Supervisor's Private Desk, No. 3 Local Test Cabinet Jack Panel, No. 20 and No. 21 Key Cabinets and various test frames.

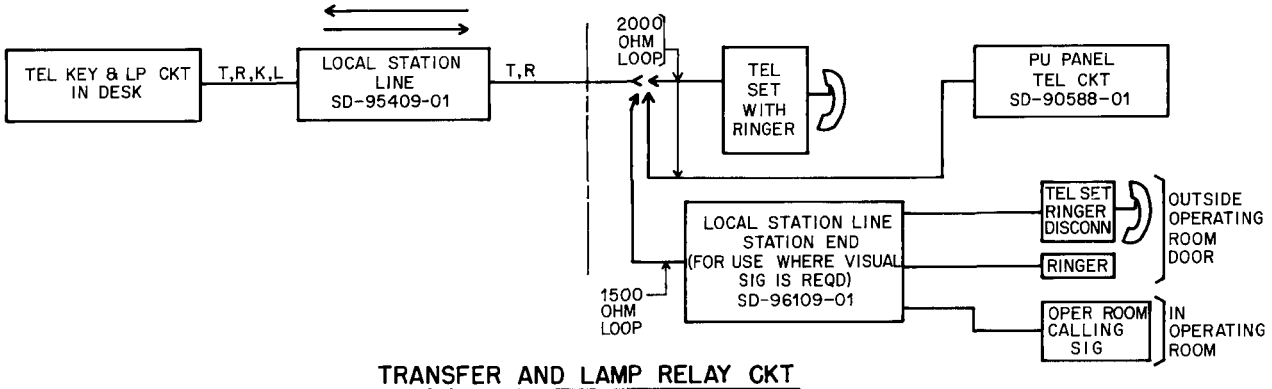
2 WAY 2 WIRE AUTOMATIC TRUNK
SD-95405-01



TIE LINE OR INTER POSITION TRUNK-3 WIRE
BETWEEN DESKS AND TEST FRAMES IN SAME BUILDING
SD-95406-01

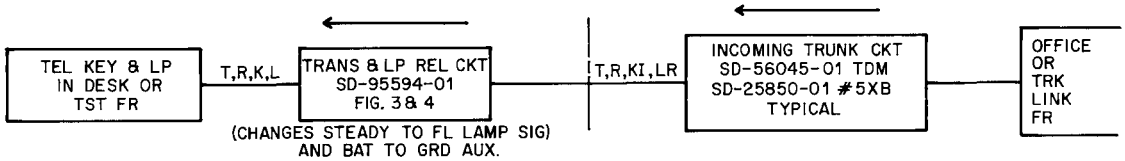

TEL KEY & LP CKT IN DESK
T,R,K,L
TIE LINE OR INTER-POSITION TRK-3 WIRE SD-95406-01
T,R,S
TIE LINE OR INTER-POSITION TRK-3 WIRE SD-95406-01
T,R,K,L
TEL KEY & LP CKT IN OTHER DESK OR TEST FR

LOCAL STATION LINE
SD-95409-01


TEL KEY & LP CKT IN DESK
T,R,K,L
LOCAL STATION LINE SD-95409-01
T,R
2000 OHM LOOP
TEL SET WITH RINGER
PU PANEL TEL CKT SD-90588-01
LOCAL STATION LINE STATION END (FOR USE WHERE VISUAL SIG IS REQD) SD-96109-01
1500 OHM LOOP
TEL SET RINGER DISCONN
RINGER
OUTSIDE OPERATING ROOM DOOR
OPER ROOM CALLING SIG
IN OPERATING ROOM

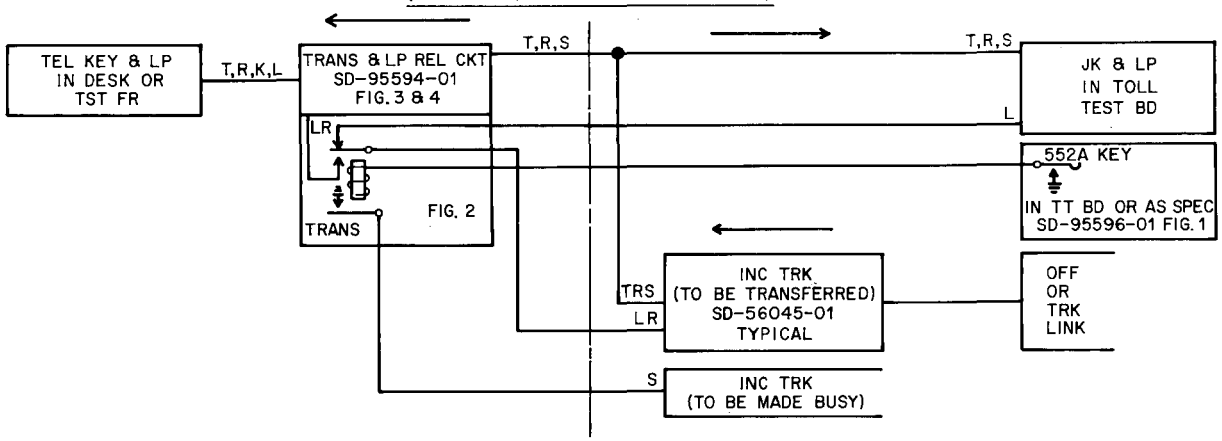
TRANSFER AND LAMP RELAY CKT
SD-95594-01

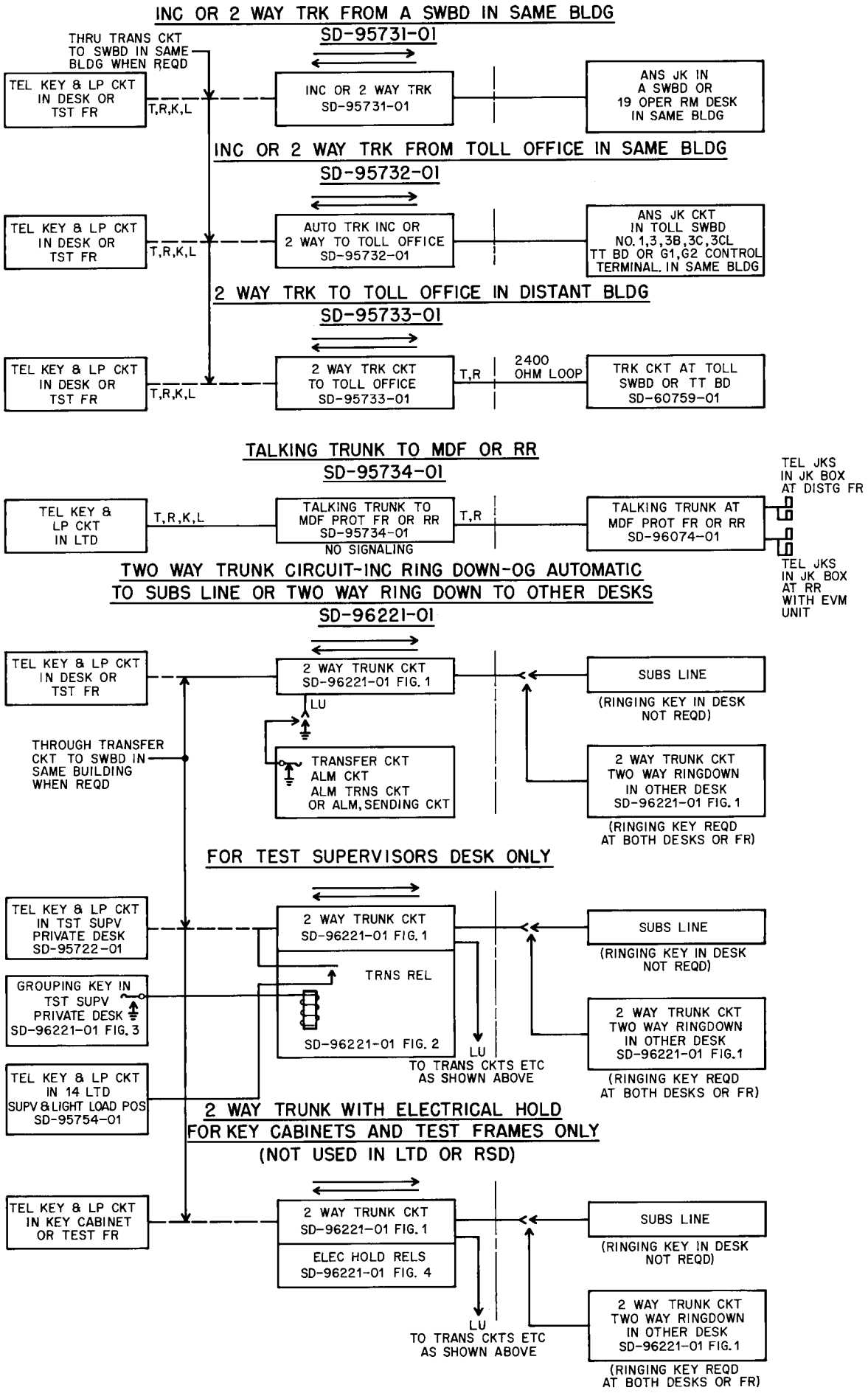
CODE 958 TRK-TERMINATING TRAFFIC
DIRECT CONN TO LOCAL FACILITIES WITHOUT TOLL TEST BD APPEARANCE
(FOR COMMUNICATION BETWEEN SWITCHING MTCE CENTERS


TEL KEY & LP IN DESK OR TST FR
T,R,K,L
TRANS & LP REL CKT SD-95594-01 FIG. 3 & 4
T,R,KI,LR
INCOMING TRUNK CKT SD-56045-01 TDM SD-25850-01 #5XB TYPICAL
OFFICE OR TRK LINK FR

(CHANGES STEADY TO FL LAMP SIG)
AND BAT TO GRD AUX.

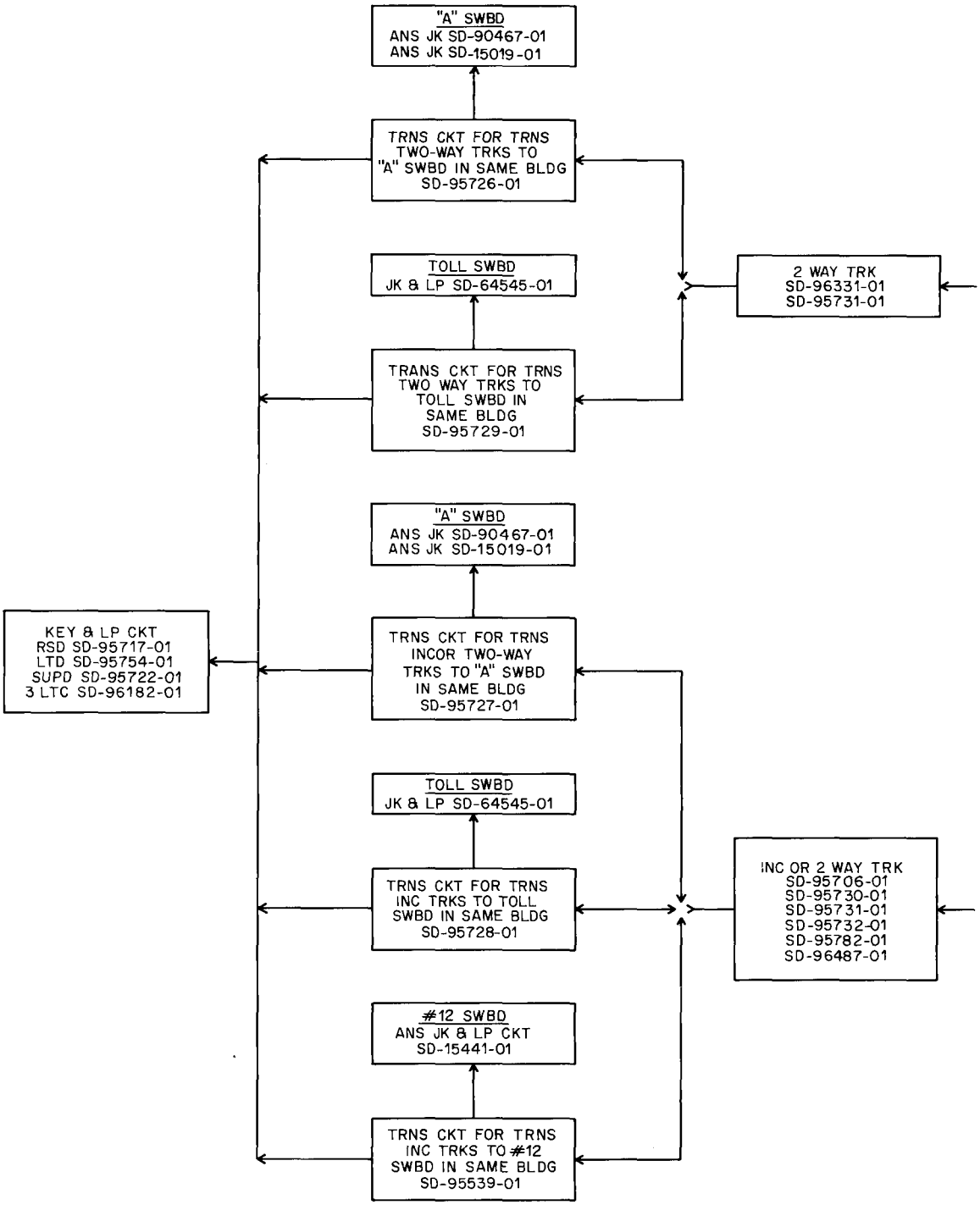
CODE 101 TRK-TERMINATING TRAFFIC
TT BD APPEARANCE WITH TRANSFER TO LOCAL FACILITIES-LTD, KEY CAB OR TST FR
(SEE DEVELOPEMENT LETTER SW 7231)



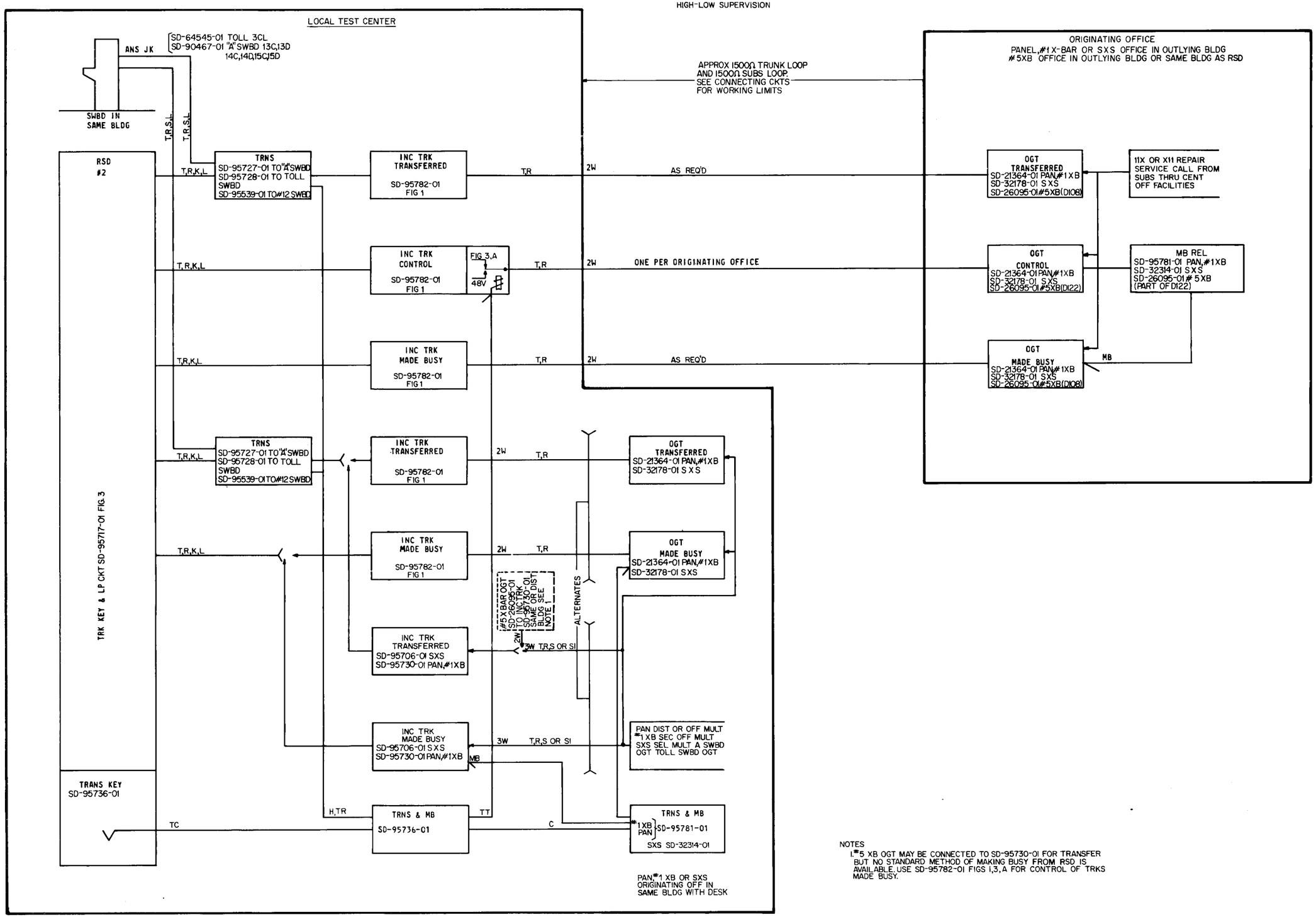

INC OR 2 WAY TRK FROM A SWBD IN SAME BLDG
SD-95731-01
THRU TRANS CKT TO SWBD IN SAME BLDG WHEN REQD
TEL KEY & LP CKT IN DESK OR TST FR
T,R,K,L
INC OR 2 WAY TRK SD-95731-01
ANS JK IN A SWBD OR 19 OPER RM DESK IN SAME BLDG
INC OR 2 WAY TRK FROM TOLL OFFICE IN SAME BLDG
SD-95732-01
TEL KEY & LP CKT IN DESK OR TST FR
T,R,K,L
AUTO TRK INC OR 2 WAY TO TOLL OFFICE SD-95732-01
ANS JK CKT IN TOLL SWBD NO.1,3,3B,3C,3CL TT BD OR G1,G2 CONTROL TERMINAL. IN SAME BLDG
2 WAY TRK TO TOLL OFFICE IN DISTANT BLDG
SD-95733-01
TEL KEY & LP CKT IN DESK OR TST FR
T,R,K,L
2 WAY TRK CKT TO TOLL OFFICE SD-95733-01
T,R
2400 OHM LOOP
TRK CKT AT TOLL SWBD OR TT BD SD-60759-01
TALKING TRUNK TO MDF OR RR
SD-95734-01
TEL KEY & LP CKT IN LTD
T,R,K,L
TALKING TRUNK TO MDF PROT FR OR RR SD-95734-01
NO SIGNALING
T,R
TALKING TRUNK AT MDF PROT FR OR RR SD-96074-01
TEL JKS IN JK BOX AT DISTG FR
TEL JKS IN JK BOX AT RR WITH EVM UNIT
TWO WAY TRUNK CIRCUIT-INC RING DOWN-OG AUTOMATIC
TO SUBS LINE OR TWO WAY RING DOWN TO OTHER DESKS
SD-96221-01
TEL KEY & LP CKT IN DESK OR TST FR
2 WAY TRUNK CKT SD-96221-01 FIG. 1
LU
SUBS LINE
(RINGING KEY IN DESK NOT REQD)
THROUGH TRANSFER CKT TO SWBD IN SAME BUILDING WHEN REQD
TRANSFER CKT
ALM CKT
ALM TRNS CKT
OR ALM, SENDING CKT
2 WAY TRUNK CKT TWO WAY RINGDOWN IN OTHER DESK SD-96221-01 FIG. 1
(RINGING KEY REQD AT BOTH DESKS OR FR)
FOR TEST SUPERVISORS DESK ONLY
TEL KEY & LP CKT IN TST SUPV PRIVATE DESK SD-95722-01
2 WAY TRUNK CKT SD-96221-01 FIG. 1
SUBS LINE
(RINGING KEY IN DESK NOT REQD)
GROUPING KEY IN TST SUPV PRIVATE DESK SD-96221-01 FIG. 3
TRNS REL
SD-96221-01 FIG. 2
LU
TO TRANS CKTS ETC AS SHOWN ABOVE
2 WAY TRUNK CKT TWO WAY RINGDOWN IN OTHER DESK SD-96221-01 FIG.1
(RINGING KEY REQD AT BOTH DESKS OR FR)
TEL KEY & LP CKT IN 14 LTD SUPV & LIGHT LOAD POS SD-95754-01
2 WAY TRUNK WITH ELECTRICAL HOLD
FOR KEY CABINETS AND TEST FRAMES ONLY
(NOT USED IN LTD OR RSD)
TEL KEY & LP CKT IN KEY CABINET OR TEST FR
2 WAY TRUNK CKT SD-96221-01 FIG. 1
SUBS LINE
(RINGING KEY IN DESK NOT REQD)
ELEC HOLD RELS SD-96221-01 FIG. 4
LU
TO TRANS CKTS ETC AS SHOWN ABOVE
2 WAY TRUNK CKT TWO WAY RINGDOWN IN OTHER DESK SD-96221-01 FIG.1
(RINGING KEY REQD AT BOTH DESKS OR FR)

TRANSFER CIRCUITS

SWBD AND DESK IN SAME BLDG


"A" SWBD
ANS JK SD-90467-01
ANS JK SD-15019-01
TRNS CKT FOR TRNS TWO-WAY TRKS TO "A" SWBD IN SAME BLDG SD-95726-01
TOLL SWBD
JK & LP SD-64545-01
2 WAY TRK
SD-96331-01
SD-95731-01
TRANS CKT FOR TRNS TWO WAY TRKS TO TOLL SWBD IN SAME BLDG SD-95729-01
"A" SWBD
ANS JK SD-90467-01
ANS JK SD-15019-01
KEY & LP CKT
RSD SD-95717-01
LTD SD-95754-01
SUPD SD-95722-01
3 LTC SD-96182-01
TRNS CKT FOR TRNS INCOR TWO-WAY TRKS TO "A" SWBD IN SAME BLDG SD-95727-01
TOLL SWBD
JK & LP SD-64545-01
INC OR 2 WAY TRK
SD-95706-01
SD-95730-01
SD-95731-01
SD-95732-01
SD-95782-01
SD-96487-01
TRNS CKT FOR TRNS INC TRKS TO TOLL SWBD IN SAME BLDG SD-95728-01
#12 SWBD
ANS JK & LP CKT
SD-15441-01
TRNS CKT FOR TRNS INC TRKS TO #12 SWBD IN SAME BLDG SD-95539-01

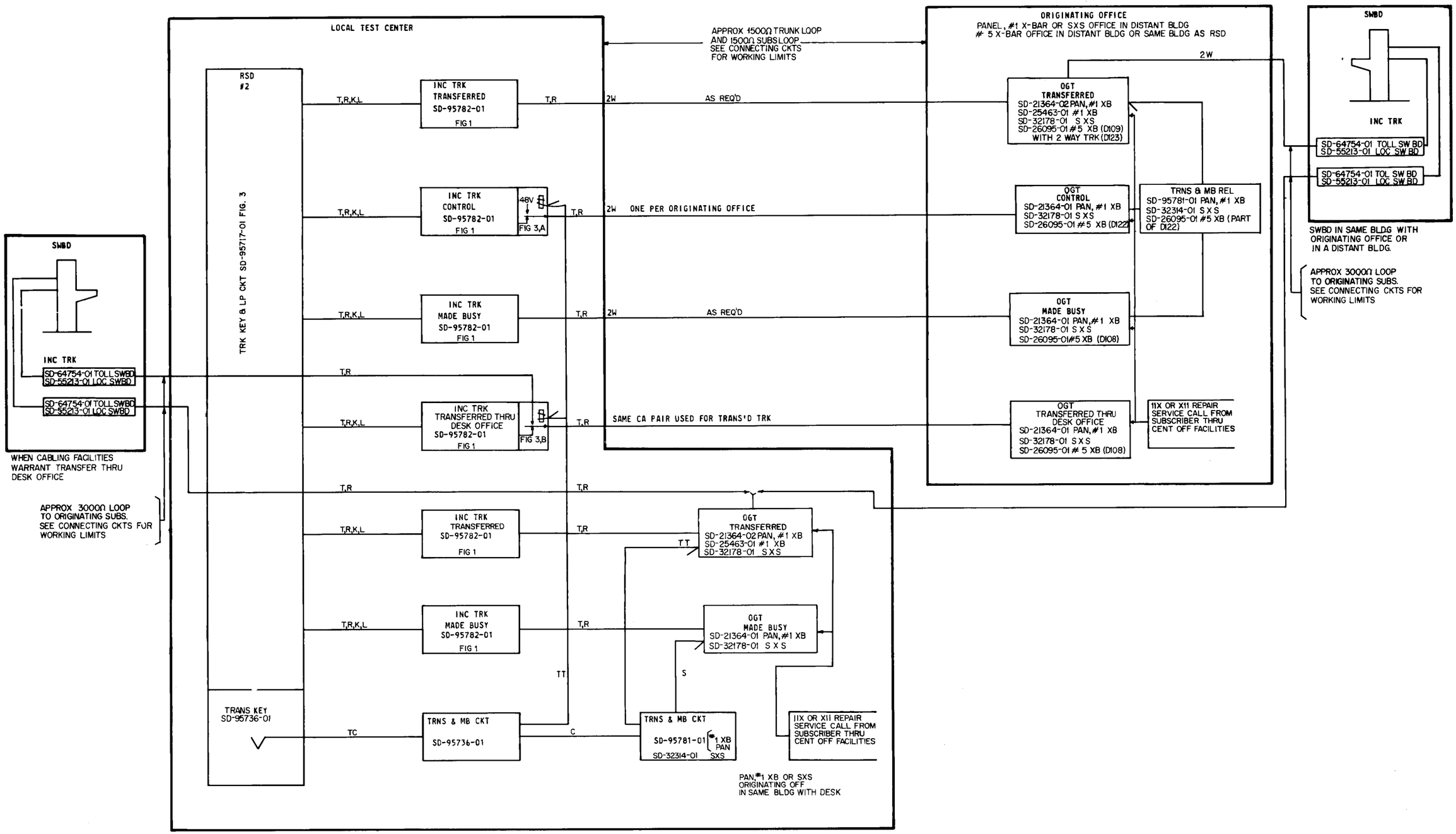
TYPICAL
REPAIR SERVICE TRUNK TRANSFER FACILITIES
RSD AND SWBD IN SAME BUILDING



NOTES
1. #5 XB OGT MAY BE CONNECTED TO SD-95730-01 FOR TRANSFER BUT NO STANDARD METHOD OF MAKING BUSY FROM RSD IS AVAILABLE. USE SD-95782-01 FIGS 1,3,A FOR CONTROL OF TRKS MADE BUSY.

TYPICAL
REPAIR SERVICE TRUNK TRANSFER FACILITIES
RSD AND SWBD IN DIFFERENT BUILDINGS

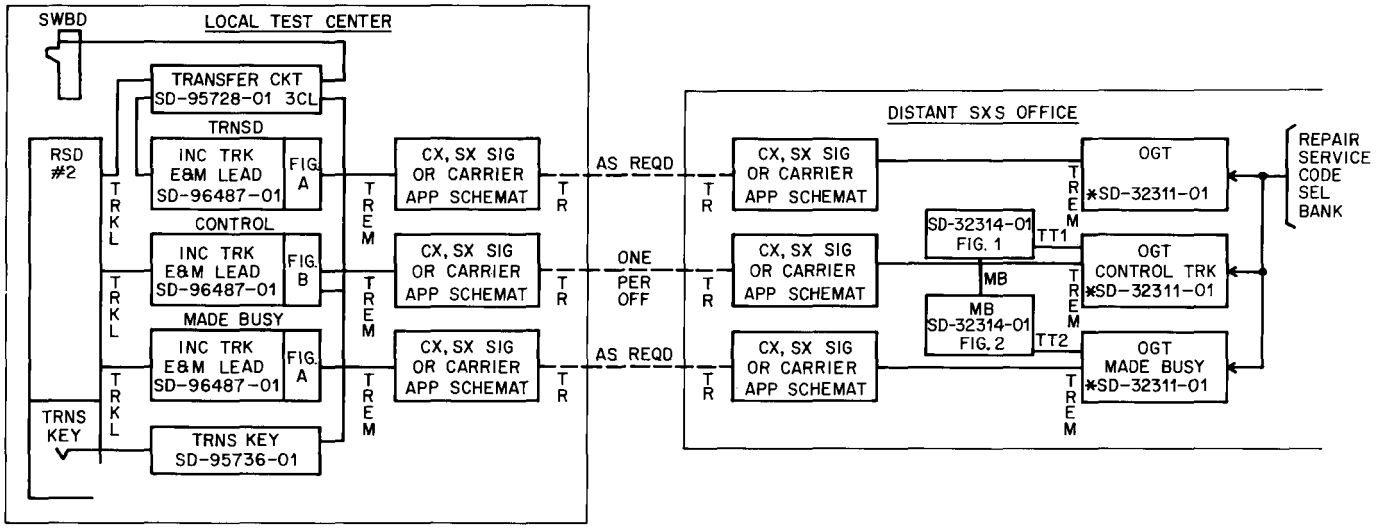
HIGH-LOW SUPERVISION


LOCAL TEST CENTER
RSD #2
TRK KEY & LP CKT SD-95717-01 FIG. 3
APPROX 1500Ω TRUNK LOOP AND 1500Ω SUBS LOOP SEE CONNECTING CKTS FOR WORKING LIMITS
ORIGINATING OFFICE
PANEL, #1 X-BAR OR SXS OFFICE IN DISTANT BLDG
5 X-BAR OFFICE IN DISTANT BLDG OR SAME BLDG AS RSD
SWBD
INC TRK
SD-64754-01 TOLL SWBD
SD-55213-01 LOC SWBD
WHEN CABLING FACILITIES WARRANT TRANSFER THRU DESK OFFICE
APPROX 3000Ω LOOP TO ORIGINATING SUBS. SEE CONNECTING CKTS FOR WORKING LIMITS
T,R,K,L
T,R
2W
AS REQ'D
INC TRK TRANSFERRED SD-95782-01 FIG 1
OGT TRANSFERRED SD-21364-02 PAN, #1 XB SD-25463-01 #1 XB SD-32178-01 S XS SD-26095-01 #5 XB (D109) WITH 2 WAY TRK (D123)
INC TRK CONTROL SD-95782-01 FIG 1
48V
FIG 3,A
ONE PER ORIGINATING OFFICE
OGT CONTROL SD-21364-01 PAN, #1 XB SD-32178-01 S XS SD-26095-01 #5 XB (D122)
TRNS & MB REL SD-95781-01 PAN, #1 XB SD-32314-01 S X S SD-26095-01 #5 XB (PART OF D122)
SWBD IN SAME BLDG WITH ORIGINATING OFFICE OR IN A DISTANT BLDG.
INC TRK MADE BUSY SD-95782-01 FIG 1
OGT MADE BUSY SD-21364-01 PAN, #1 XB SD-32178-01 S X S SD-26095-01 #5 XB (D108)
INC TRK TRANSFERRED THRU DESK OFFICE SD-95782-01 FIG 1
FIG 3,B
SAME CA PAIR USED FOR TRANS'D TRK
OGT TRANSFERRED THRU DESK OFFICE SD-21364-01 PAN, #1 XB SD-32178-01 S X S SD-26095-01 # 5 XB (D108)
11X OR X11 REPAIR SERVICE CALL FROM SUBSCRIBER THRU CENT OFF FACILITIES
OGT TRANSFERRED SD-21364-02 PAN, #1 XB SD-25463-01 #1 XB SD-32178-01 S X S
TT
OGT MADE BUSY SD-21364-01 PAN, #1 XB SD-32178-01 S X S
S
TRANS KEY SD-95736-01
TC
TRNS & MB CKT SD-95736-01
C
TRNS & MB CKT SD-95781-01 *1 XB PAN SD-32314-01 SXS
11X OR X11 REPAIR SERVICE CALL FROM SUBSCRIBER THRU CENT OFF FACILITIES
PAN,*1 XB OR SXS ORIGINATING OFF IN SAME BLDG WITH DESK

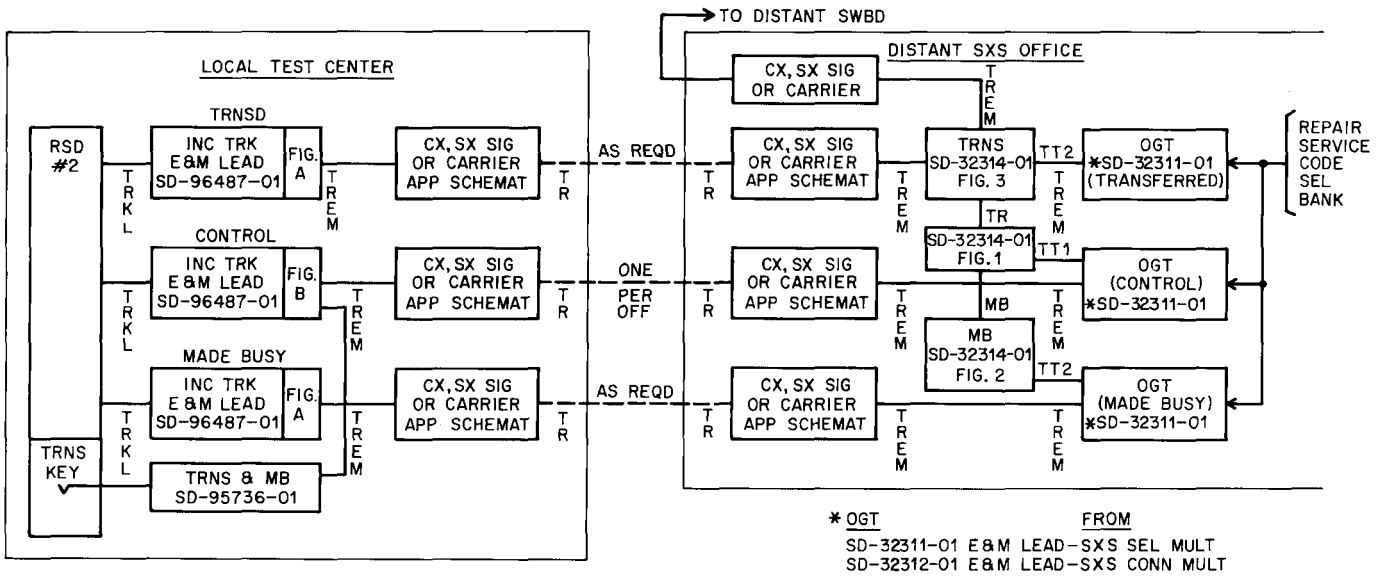
REPAIR SERVICE TRUNK TRANSFER FACILITIES-E & M LEAD SIG

SXS OFFICE

SWBD AND LOCAL TEST CENTER IN SAME BLDG

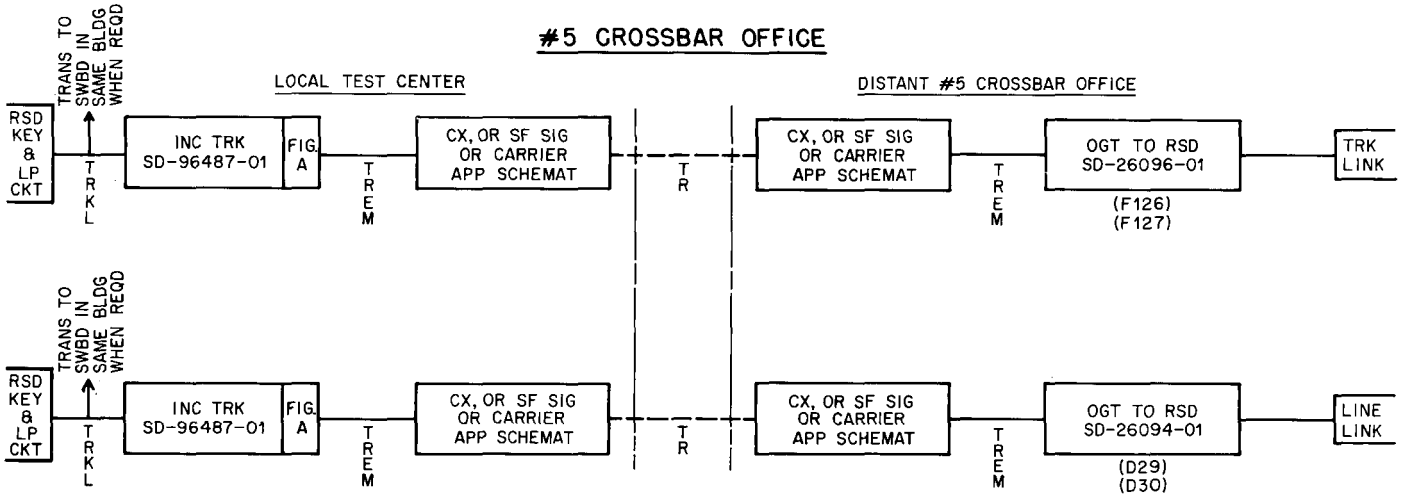


SWBD IN DISTANT BLDG



*OGT FROM
SD-32311-01 E&M LEAD-SXS SEL MULT
SD-32312-01 E&M LEAD-SXS CONN MULT

#5 CROSSBAR OFFICE



NOTE – NIGHT TRANSFER TO SWBD IN A DISTANT BUILDING MUST BE PROVIDED ON A JOB BASIS.

SECTION VI

OTHER EQUIPMENT LOCATED IN THE LOCAL TEST CENTER

		PAGE
A.	Extension Alarm Cabinet (PBX Alarm Cabinet)	209
	1. Drawings	209
	2. Illustrations	210
B.	Line Insulation Test Frame	211
	1. Circuits and Equipment	211
	2. Traffic Diagrams	211
	3. Illustrations	217

SECTION VI

OTHER EQUIPMENT LOCATED IN THE LOCAL TEST CENTER

A. Extension Alarm Cabinet (PBX Alarm Cabinet)

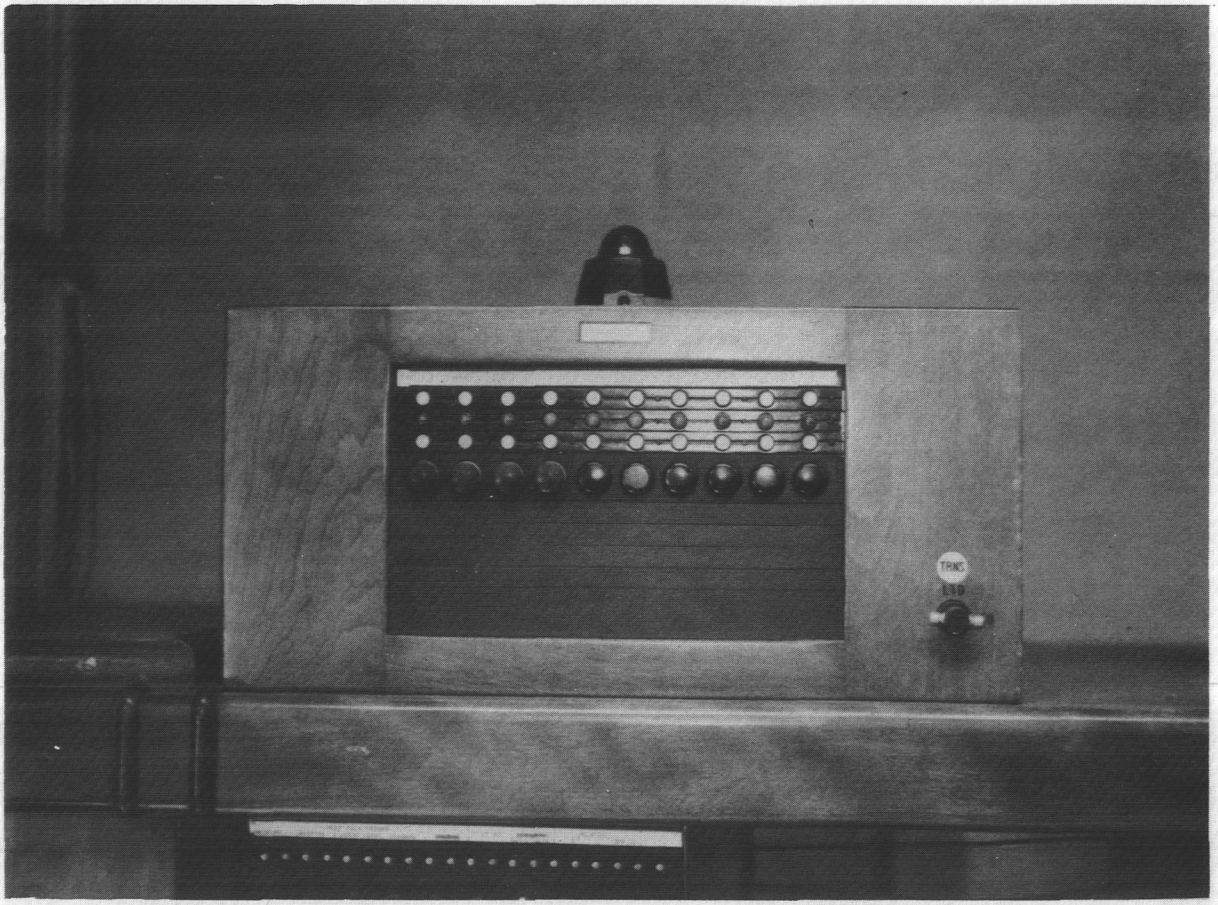
The extension alarm or PBX alarm cabinet is used for receiving alarm indications over separate cable pairs from distant unattended offices, PBX's or cable protection devices.

It consists of a lamp cabinet containing lamp signals and keys for retiring the alarms. The associated relay equipment is located on the relay rack.

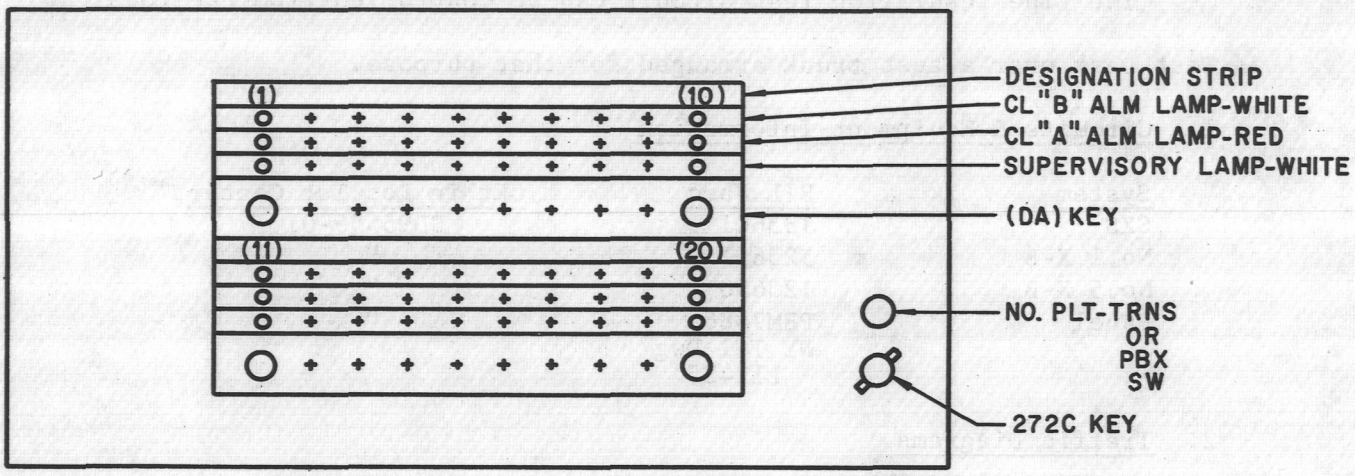
The location of the lamp cabinet is determined by the local maintenance conditions and is specified by the Telephone Company. This cabinet is sometimes mounted on the top of the Local Test Desk in the Local Test Center.

1. Drawings:

Cabinet Equipment	ED90454-13
Cabinet Assembly	ED90753-30
Extension Alarm Circuit	SD95484-01
PBX Alarm Circuit (Panel)	SD21482-01



Extension Alarm Cabinet mounted on top of Local Test Desk.



EXTENSION ALARM CABINET

B. Automatic Line Insulation Test Circuit

The Automatic Line Insulation Test Circuit automatically scans the subscriber lines and tests the line insulation resistance in rapid succession. The line numbers of those which do not meet predetermined limits are printed on a receive only teletypewriter. The Line Insulation Test Frame may be located in the same building as the Local Test Desk and in distant buildings. The teletypewriter and associated Delay and Preference relay rack units are usually located in the Local Test Center so that appropriate action can be taken by the test desk personnel before service interruptions develop.

This, together with the Electronic Voltmeter and other developments, has contributed to better maintenance with fewer positions of Local Test Desk.

The Line Insulation Test Circuit obtains access to the subscriber lines for testing by sharing a test train or part of a test train with the test desk. When the test train is in use by one, a busy signal is returned to the other.

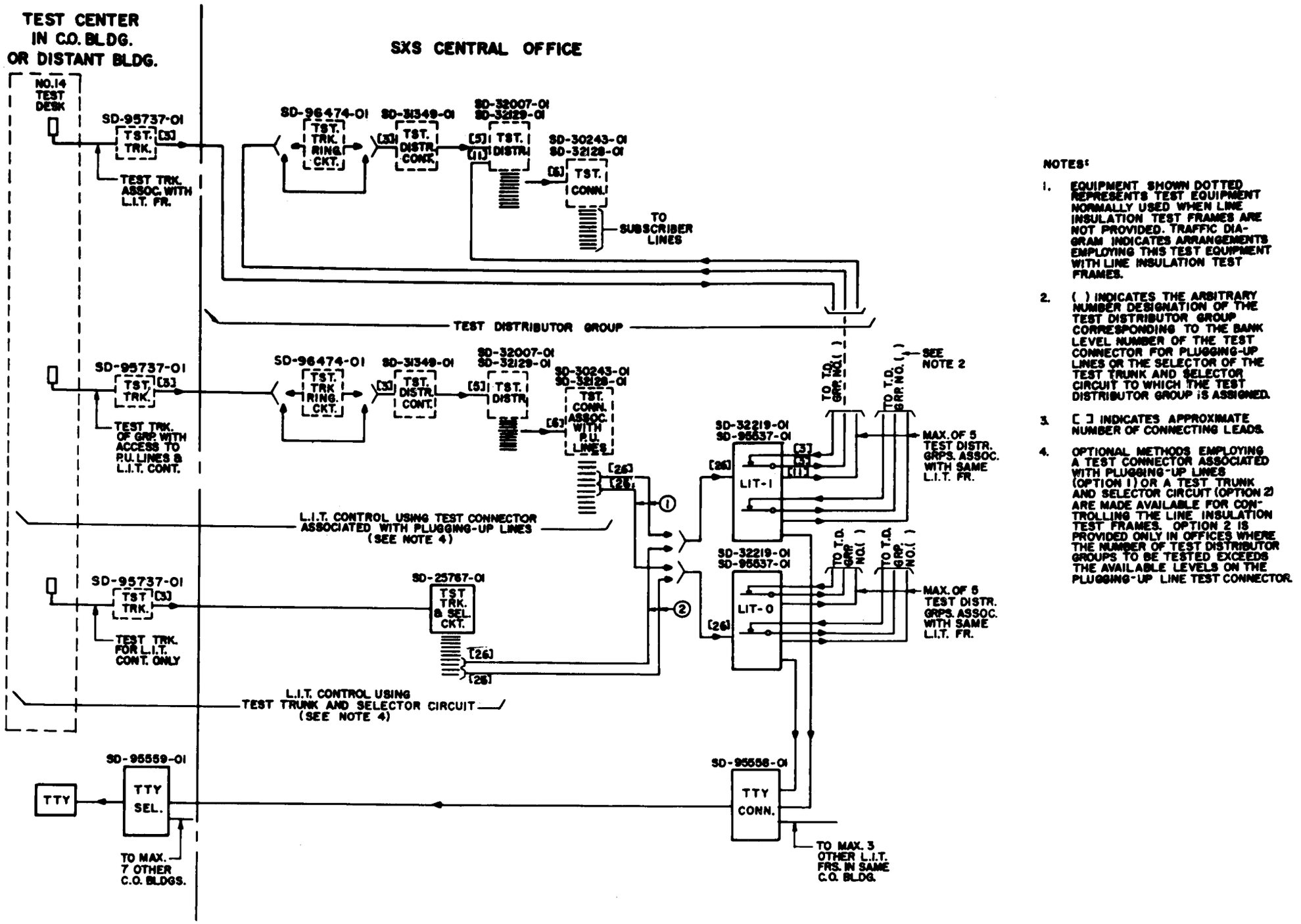
The Line Insulation Test Circuit can be controlled from the Local Test Desk over a test trunk arranged for that purpose.

1. Circuits & Equipment Information

System	BTL Spec	Ckt in Loc Tst Center
SXS	J33601	SD95559-01
No.1 X-B	J23651	"
No.5 X-B	J23650	"
Panel	PEM7486 NY Tel Dwg L13435	"

2. Traffic Diagrams

Typical traffic diagrams for the various systems are shown in the sketches which follow.

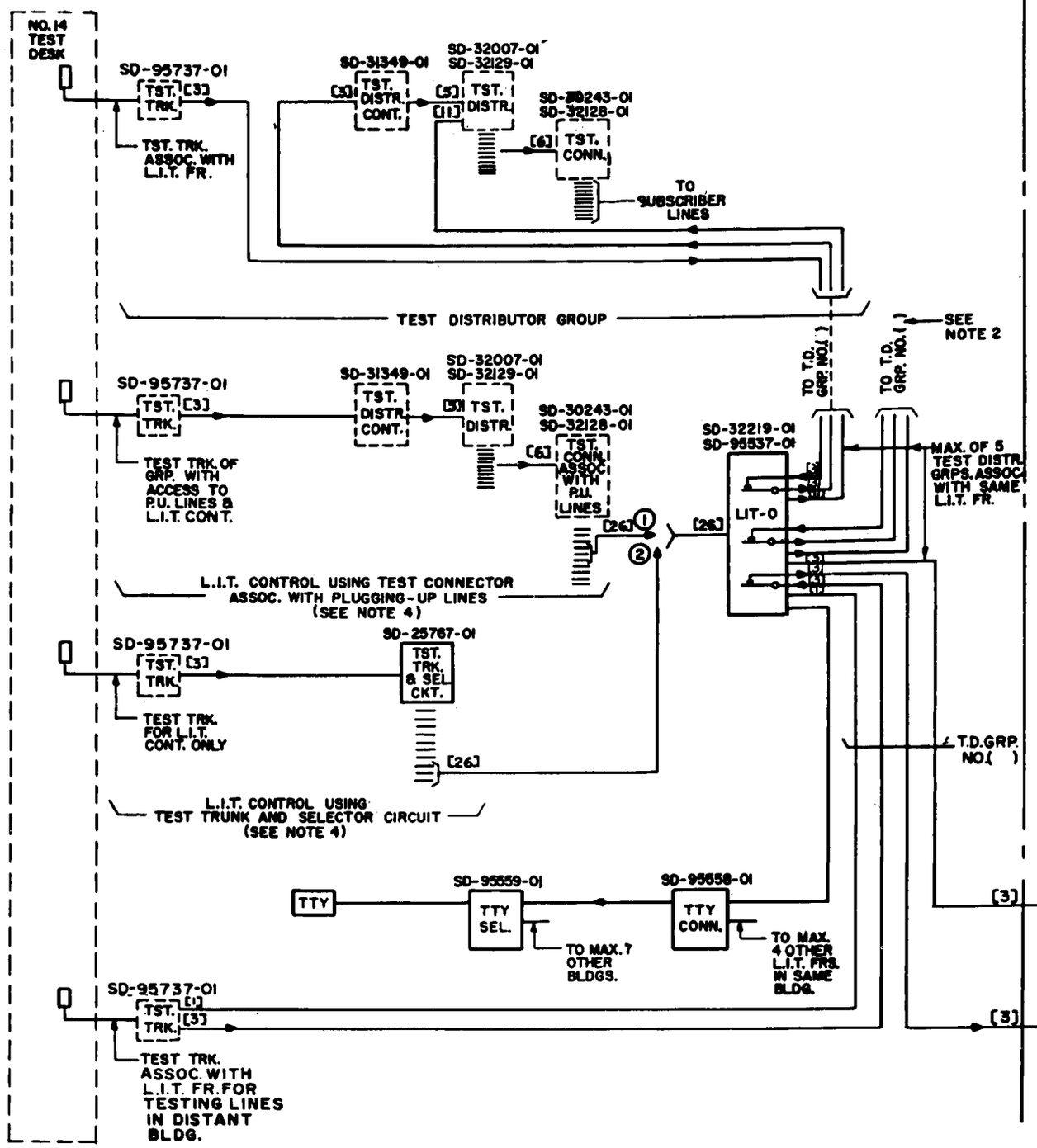


NOTES:

1. EQUIPMENT SHOWN DOTTED REPRESENTS TEST EQUIPMENT NORMALLY USED WHEN LINE INSULATION TEST FRAMES ARE NOT PROVIDED. TRAFFIC DIAGRAM INDICATES ARRANGEMENTS EMPLOYING THIS TEST EQUIPMENT WITH LINE INSULATION TEST FRAMES.
2. ( ) INDICATES THE ARBITRARY NUMBER DESIGNATION OF THE TEST DISTRIBUTOR GROUP CORRESPONDING TO THE BANK LEVEL NUMBER OF THE TEST CONNECTOR FOR PLUGGING-UP LINES OR THE SELECTOR OF THE TEST TRUNK AND SELECTOR CIRCUIT TO WHICH THE TEST DISTRIBUTOR GROUP IS ASSIGNED.
3. [ ] INDICATES APPROXIMATE NUMBER OF CONNECTING LEADS.
4. OPTIONAL METHODS EMPLOYING A TEST CONNECTOR ASSOCIATED WITH PLUGGING-UP LINES (OPTION 1) OR A TEST TRUNK AND SELECTOR CIRCUIT (OPTION 2) ARE MADE AVAILABLE FOR CONTROLLING THE LINE INSULATION TEST FRAMES. OPTION 2 IS PROVIDED ONLY IN OFFICES WHERE THE NUMBER OF TEST DISTRIBUTOR GROUPS TO BE TESTED EXCEEDS THE AVAILABLE LEVELS ON THE PLUGGING-UP LINE TEST CONNECTOR.

Fig. 2 - Typical Traffic Diagram for Two Line Insulation Test Frames Each Associated With Two Test Distributor Groups - No. 14 Test Desk

TEST CENTER IN SXS CENTRAL OFFICE

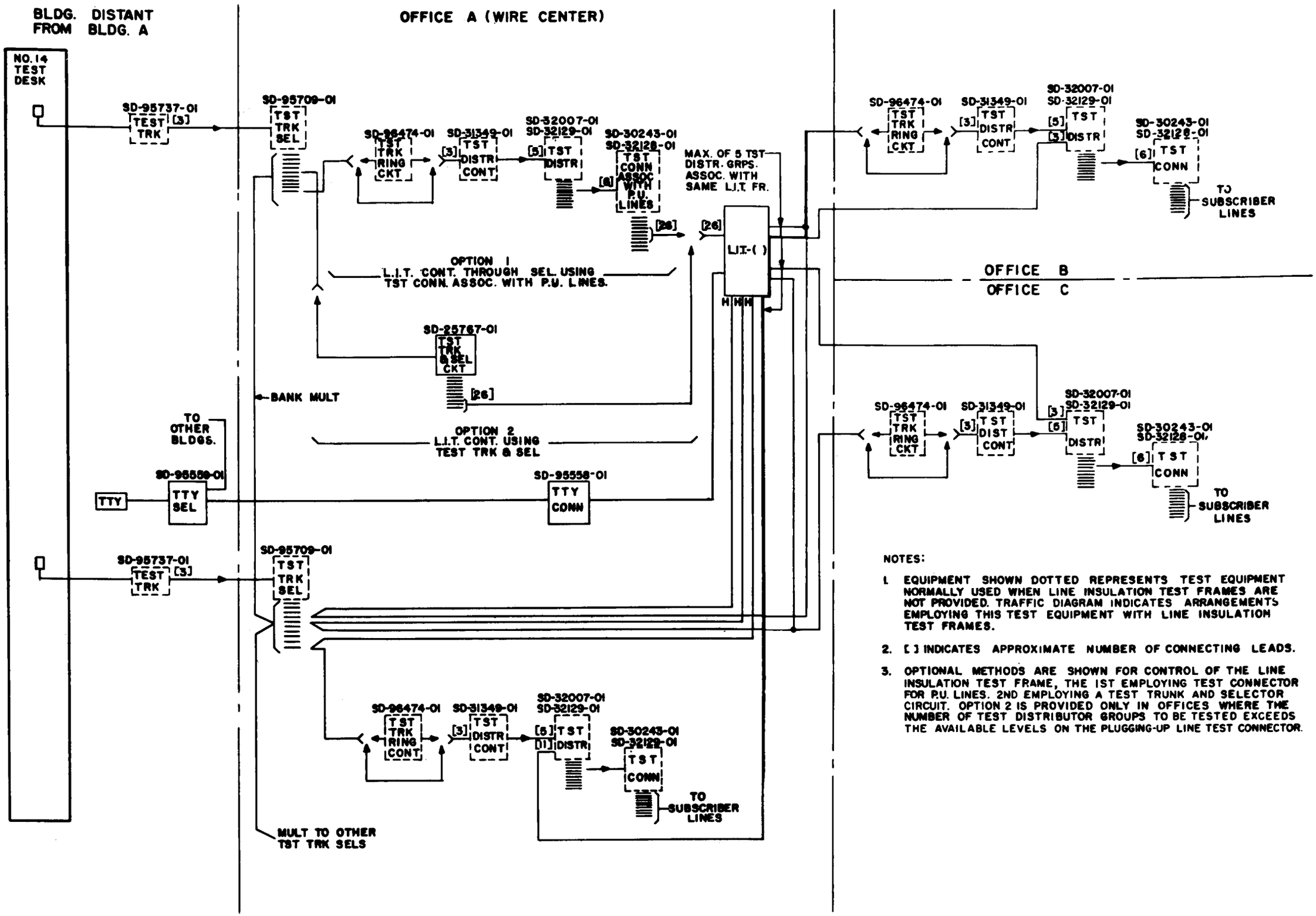


OUTLYING SXS CENTRAL OFFICE

NOTES:

1. EQUIPMENT SHOWN DOTTED REPRESENTS TEST EQUIPMENT NORMALLY USED WHEN LINE INSULATION TEST FRAMES ARE NOT PROVIDED. TRAFFIC DIAGRAM INDICATES ARRANGEMENTS EMPLOYING THIS TEST EQUIPMENT WITH LINE INSULATION TEST FRAMES.
2. ( ) INDICATES THE ARBITRARY NUMBER DESIGNATION OF THE TEST DISTRIBUTOR GROUP CORRESPONDING TO THE BANK LEVEL NUMBER OF THE TEST CONNECTOR FOR PLUGGING-UP LINES OR THE SELECTOR OF THE TEST TRUNK AND SELECTOR CIRCUIT TO WHICH THE TEST DISTRIBUTOR GROUP IS ASSIGNED.
3. [ ] INDICATES APPROXIMATE NUMBER OF CONNECTING LEADS.
4. OPTIONAL METHODS EMPLOYING A TEST CONNECTOR ASSOCIATED WITH PLUGGING-UP LINES (OPTION 1) OR A TEST TRUNK AND SELECTOR CIRCUIT (OPTION 2) ARE MADE AVAILABLE FOR CONTROLLING THE LINE INSULATION TEST FRAME. OPTION 2 IS PROVIDED ONLY IN OFFICES WHERE THE NUMBER OF TEST DISTRIBUTOR GROUPS TO BE TESTED EXCEEDS THE AVAILABLE LEVELS ON THE PLUGGING-UP LINE TEST CONNECTOR.

Typical Traffic Diagram for One Line Insulation Test Frame Arranged to Test Two Test Distributor Groups Within the Building and One Test Distributor Group in an Outlying Office - No. 14 Test Desk

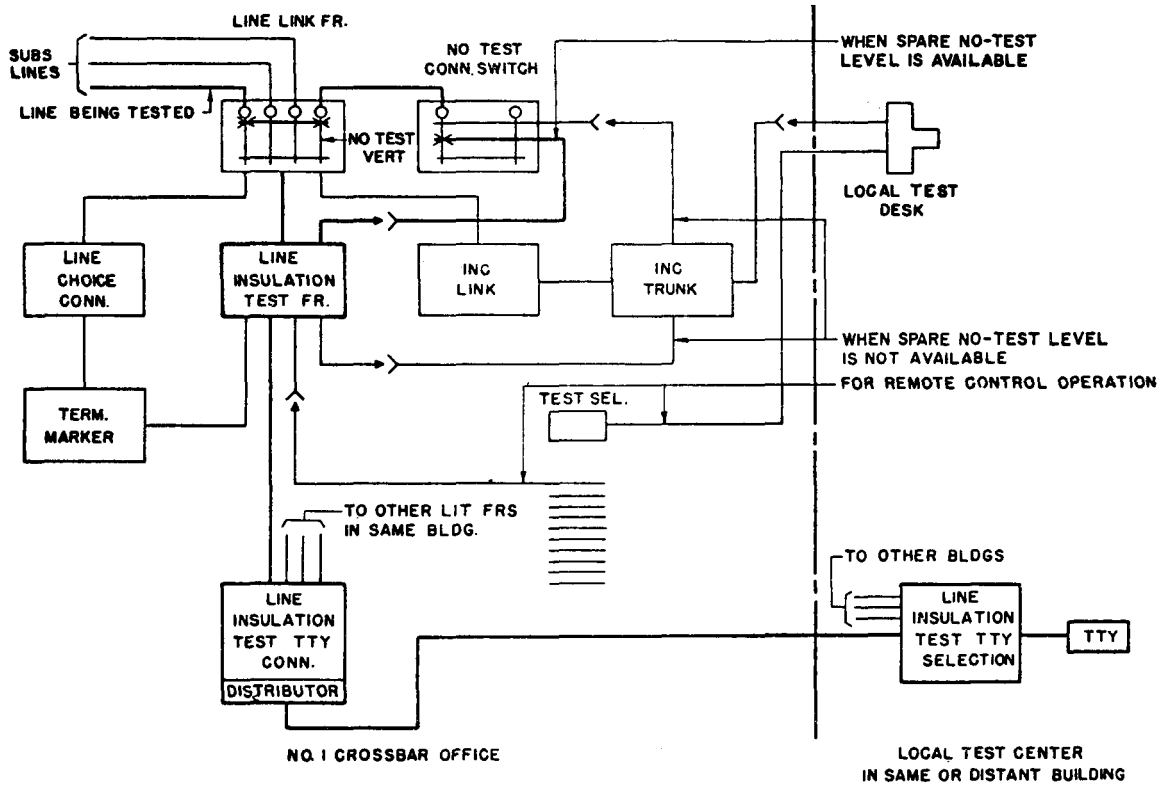

BLDG. DISTANT FROM BLDG. A
OFFICE A (WIRE CENTER)
NO. 14 TEST DESK
SD-95737-01 TEST TRK [3]
SD-95709-01 TST TRK SEL
SD-96474-01 TST TRK RING CKT
SD-31349-01 TST DISTR CONT [3]
SD-32007-01 SD-32129-01 TST DISTR [5]
SD-30243-01 SD-32128-01 TST CONN ASSOC WITH P.U. LINES [6]
[26]
MAX. OF 5 TST DISTR. GRPS. ASSOC. WITH SAME L.I.T. FR.
LIT-( )
H H H H
TO SUBSCRIBER LINES
OPTION 1
L.I.T. CONT. THROUGH SEL. USING TST CONN. ASSOC. WITH P.U. LINES.
SD-25767-01 TST TRK & SEL CKT
BANK MULT
OFFICE B
OFFICE C
TO OTHER BLDGS.
OPTION 2
L.I.T. CONT. USING TEST TRK & SEL
SD-96559-01 TTY SEL
TTY
SD-95558-01 TTY CONN
SD-95737-01 TEST TRK [3]
SD-95709-01 TST TRK SEL
SD-96474-01 TST TRK RING CONT
SD-31349-01 TST DISTR CONT [3]
SD-32007-01 SD-32129-01 TST DISTR [5] [1]
SD-30243-01 SD-32128-01 TST CONN
TO SUBSCRIBER LINES
MULT TO OTHER TST TRK SELS

NOTES:

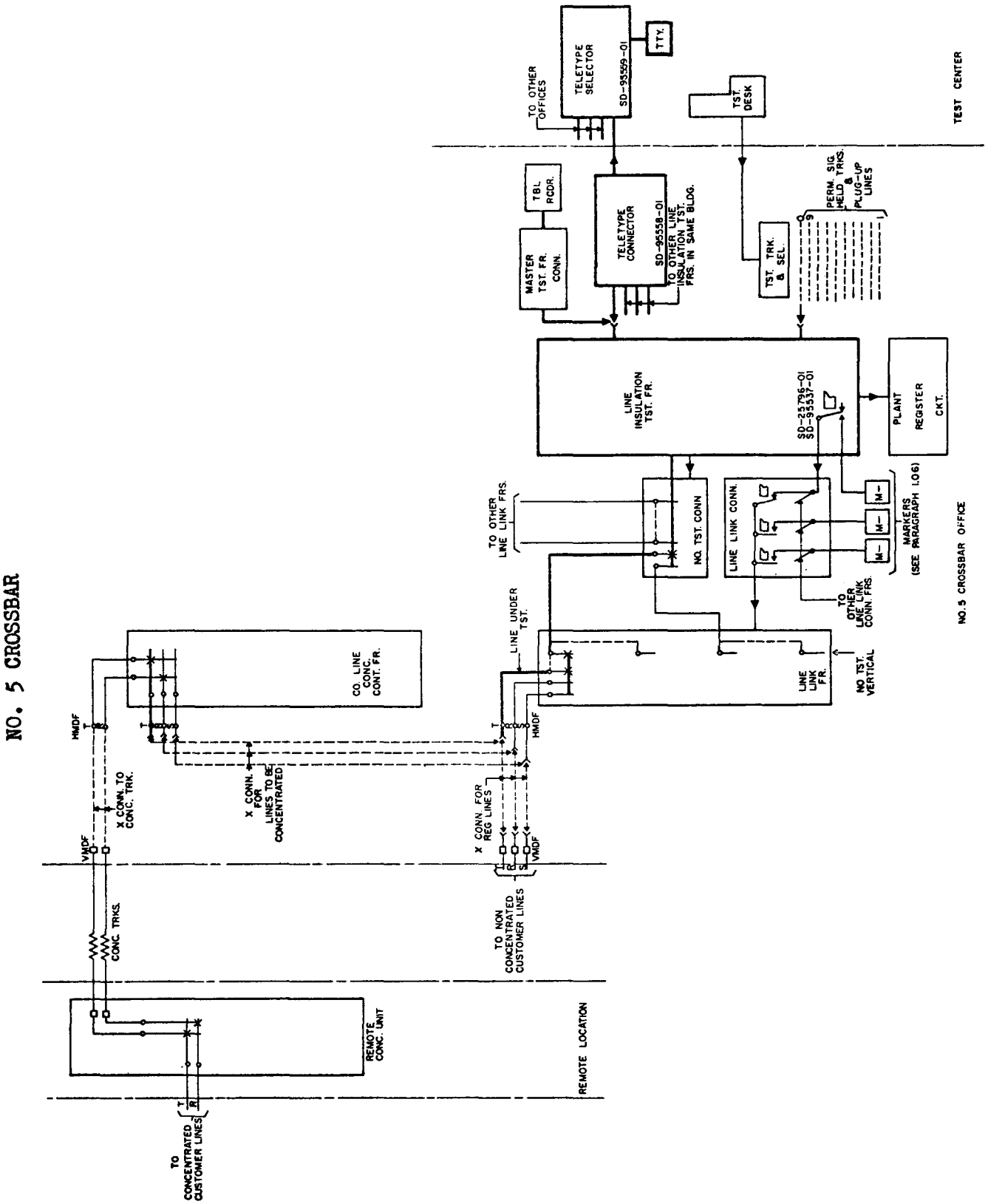
1. EQUIPMENT SHOWN DOTTED REPRESENTS TEST EQUIPMENT NORMALLY USED WHEN LINE INSULATION TEST FRAMES ARE NOT PROVIDED. TRAFFIC DIAGRAM INDICATES ARRANGEMENTS EMPLOYING THIS TEST EQUIPMENT WITH LINE INSULATION TEST FRAMES.
2. [ ] INDICATES APPROXIMATE NUMBER OF CONNECTING LEADS.
3. OPTIONAL METHODS ARE SHOWN FOR CONTROL OF THE LINE INSULATION TEST FRAME, THE 1ST EMPLOYING TEST CONNECTOR FOR P.U. LINES. 2ND EMPLOYING A TEST TRUNK AND SELECTOR CIRCUIT. OPTION 2 IS PROVIDED ONLY IN OFFICES WHERE THE NUMBER OF TEST DISTRIBUTOR GROUPS TO BE TESTED EXCEEDS THE AVAILABLE LEVELS ON THE PLUGGING-UP LINE TEST CONNECTOR.

Fig. 4 - Typical Traffic Diagram for One Line Insulation Test Frame When Test Trunk Selector is Used - No. 14 Test Desk

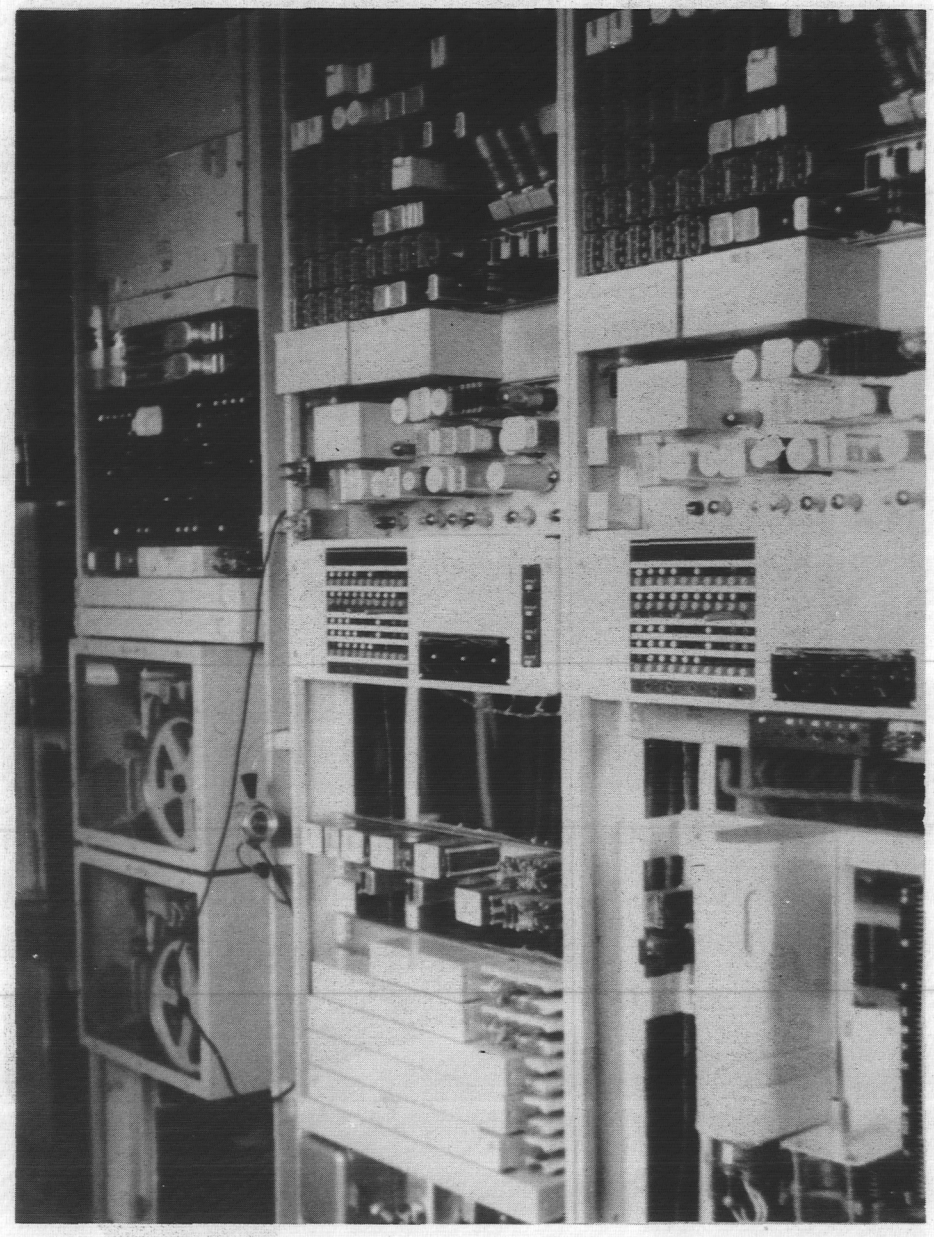
NO. 1 CROSSBAR



Schematic of Line Insulation Test Equipment



- Line Insulation Test Frame - Traffic Diagram



Line Insulation Test Frame showing a test trunk & selector switch in the foreground. The equipment in the third bay in the background is part of the No. 6A Announcement System.

NO. 28 Receive-only Teletypewriter (28RO)

Dimensions - 20½" wide, 18½" deep, 40½" high
Power Reqts - 65 Watts, regulated 60 cycles 110-120V A.C.
Weight - 120 Lbs.
Color - Gray-green textured vinyl

SECTION VII

REFERENCES AND MISCELLANEOUS INFORMATION

		PAGE
A.	REFERENCES	220
	1. Forms, Keysheets and "J" Specs	220
	2. Bell System Practices	220
	3. A. T. & T. CO. Circulars, Memos & Letters	221
	4. Systems Coordinator	222
B.	MISCELLANEOUS	223
	1. Res Limits Between Desk and RR in Different Buildings	223
	2. VNL Operation	223
	3. Heating Element for Humidity Control	223
	4. Portable Wheatstone Bridge	223
	5. Key Shields	224
	6. Key Tops	224
	7. Key Top Engraving	224
	8. Call Circuit Key Buttons	225
	9. Production Data	225
	10. Weight of Positions	226
	11. Relocation of Local Test Desk	227

SECTION VII

A. REFERENCES

1. Forms, Keysheets, "J" Specs

Systems Equipment Engineering Handbook

E-1598 - - - Questionnaire for Local Test Center

SFM 50A - - - Engineering Form - LTD #14

SFM 48B - - - Engineering Form - RSD #2

SFM 52A - - - Engineering Form - TST Supv. Private Desk

SD90472-01 - Keysheet - Local Test Center

J95001 - - - (AA387.022) Eqpt. Design Req. - MDF Loud Speaker

J95002 - - - (AA387.023) Eqpt. Design Req. - LTD #14

J94801 - - - (AA387.021) Eqpt. Design Req. - RSD #2

J94703 - - - (AA382.513) Eqpt. Design Req. - TST Sup Priv Desk

J93016 - - - (AA382.528) Eqpt. Design Req. - RR Units

J33601 - - - (AA237.024) SXS LIT Frame - Teletypewriter

J23650 - - - (AA247.016) #5 X-Bar LIT Frame - Teletypewriter

J23651 - - - (AA247.017) #1 X-Bar LIT Frame - Teletypewriter

2. Bell System Practices

BSP SECT

F43.221 - - - LTD #14 - Operating & Testing

F53.221 - - - LTD #14 - Description of Equipment

A438.701 - - KS3011 Wheatstone Bridge - Adjusting Procedure

A493.210 - - KS3011 WB in LTD #14 Circuits

A801.010 - - Dry Cells & Dry Batteries

3. A T & T Company Circulars, Memoranda and Letters

PEM 3690 (11-16-48)	LTD #14 - Indicating Dial Speed on Position Voltmilliammeter
PEM 4184 (7-26-50)	LTD #14 - Improvements in Wheatstone Bridge Testing Arrangements (VMB & Auto V3)
PEL 4782 (12-11-50)	LTD #14 - LTD #14 - Improved Testing Features (Electronic VM, AC, 60V, Metallic VM TST & MF Pulsing)
PEM 4933 (4-13-53)	Conductor Identification Tone - MDF and Local Test Desk
PEM 5126 (11-30-53)	LTD #14 - Means for Checking Coin Collect & Return in in SXS Office - (Coin Trunk Test CTT)
PEM 5152 (1-5-54)	LTD #14 - Extension of Trunk Range to 1500 Ohms (3000 Ohms Total)
PEM 5153 (1-5-54)	LTD #14 - Test Trunk Selector Circuit
PEM 5643 (6-1-55)	LTD #14 & RSD #2 - 48V Operation & Other Improvements
PEM 5727 (8-30-55)	LTD #14 & CTD #3 - Improved Loud Speaker Systems for Communication with M.D.F.
PEM 5842 (12-28-55)	No. 5 X-Bar - Repair Service Transfer Features
PEM 5971 (5-29-52)	LTD #14 CTD #3 - S9A Meter Anti-Static Treatment
PEM 6414 (10-1-57)	LTD #14 - Test Trunk Selector Circuit SD95709-01
PEL 6557	Recorded Repair Service Observing
PEM 6601 (4-29-58)	LTD #14 - Loudspeaker Tel. Circuit
PEM 6617 (5-13-58)	LTD #14 - Changes in Loudspeaker Arrangements
PEM 6962 (6-9-59)	KS16617 L-1 - Amplifier in MDF Announcing System
PEM 6818 (12-30-58)	Mod of Trns & LP Assem - MDF Loudspeaker
PEM 7003 (6-21-59)	Application of Flexible MDF Loudspeaker Transmitter Assem on Class "AR" Basis (See also C.M.Mapes letter to all Chief Engineers dated 9-4-59)

3. A T & T Company Circulars, Memoranda and Letters (Con't)

PEL 7177 (9-16-63) Electronic Receiver Off-Hook Tone Generator

PEM 8001 (6-19-62) MDF Loud Speaker - 4A Horn and 360 Transmitter

A T & T Company Service Codes
Unnumbered Letter dated June 27, 1962.

(For additional papers - See Topical Checklist E209)

4. Systems Coordinator for LTD

W. E. McMahon, Systems Equipment Engineering - Standards, West Chicago, Illinois

B. Miscellaneous

1. LTD and RR in Different Buildings (Max Loop Res. 15-17 Ohms)

The Local Test Desk may be located in a different building from the relay rack equipment provided the maximum return loop resistance between the desk and the Relay Rack does not exceed 15 to 17 ohms.

In the case of a large lineup. doubling up of the lamp leads may be necessary to provide satisfactory lamp brilliance.

Reference: BTL TWX 11-9-55, Sacramento, Calif.-
Main Office - Order 33447
BTL TWX 3-26-57, Houston, Texas -
Madison Office - Order 73747, 73748

2. VNL Operation

No change is required in the Local Test Center for testing offices operating on a "Via Net Loss" (VNL) basis.

3. Heating Element for Humidity Control

In areas of high humidity, heating elements are sometimes specified on a job basis for use in the rear of the Local Test Desk. Heating elements manufactured by DAMP-CHASER, INC., Hendersonville, N. C. are satisfactory for this purpose.

4. Portable Wheatstone Bridge

KS14959 L-1 Test Set (Portable) is a portable Wheatstone Bridge sometimes ordered by the Telephone Company for use with No. 14 LTD or No. 3 LTC.

5. Key Shields

When dust shields are required for the keys of the LTD or RSD, the "J" specification should be modified to omit the affected keys and to add the same keys equipped with the appropriate coded shields. (See Engineering Handbook Sect. 3)

This is necessary because the shields must be assembled by the key department during the manufacture of the keys prior to mounting in the desk by the wiring department.

6. Key Tops

Replacement key tops may be ordered by the piecepart number of the engraved key top. The piecepart number may be obtained from the assembly "A" drawing for the particular code of key.

The A1YG key for the secondary ringing circuit of the Local Test Desk is equipped with one of the following key tops engraved for semi-selective or full selective ringing as specified in the order.

Key Top	Engraving
P356197	T2, T1, Sec, R2, R1, T, R
P355131	T+, T-, Sec, R+, R-, T, R

7. Key Tops Engraved per Order

The following information may be used for specifying key tops engraved per order:

Blank Key Top	Type of Key
P135058	A1 Type with 3 Key Units
P139932	A1 Type with 2 Key Units (Middle & Rear)
P135401	A1 Type with 2 Key Units (Middle & Front)

A318776 - Engraving Position Locations for A Type Keys

(See Engineering Handbook. Sect. 3)

8. Call Circuit Key Buttons

A108226 - Standard Engraving of Key Buttons

(For Piecepart Numbers, Color and Engraving of Call Circuit Key Buttons - See SFM 48A, SFM 50A and Engineering Handbook Sect. 3)

9. Production Data

#14 Local Test Desk Positions

YEAR	J95002F-1		J95002H-1		TOTAL	
	BASIC L1	WB POS L7	BASIC L1	WB POS L8	BASIC POS	E/W WB
1954	288	66			288	66
1955	283	85			283	85
1956	256	97	9	1	265	98
1957	50	9	321	78	371	87
1958			279	69	279	69
1959			103	30	103	30
1960			158	43	158	43
1961			152	37	152	37
1962			80	17	80	17
1963			113	23	113	23
1964					* 125	

* Estimated

10. Weight

LTD Pos in Shop	470 lbs
Installed	675 lbs
Writing Shelf	110 lbs
Card File	100 lbs

11. Moving a Local Test Desk

When moving a Local Test Center to a new location, the positions are generally moved one or two at a time, removed from the growing end of the old lineup and reinstalled in reverse order at the new location.

The following illustration taken from the BEE, shows an interesting moving job in which a 6 position lineup was moved in tact.

MOVING A TEST DESK?

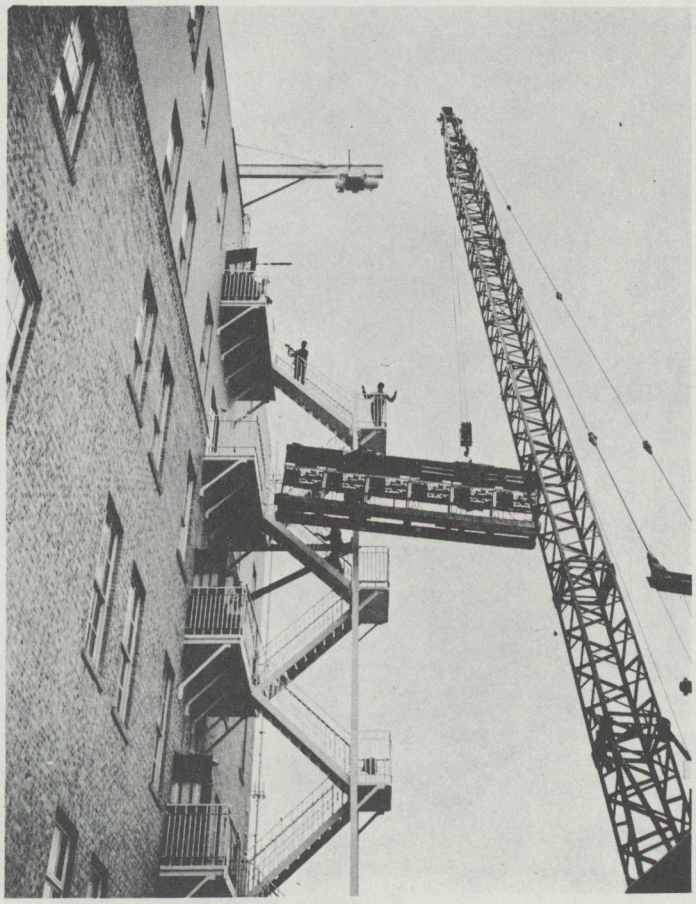
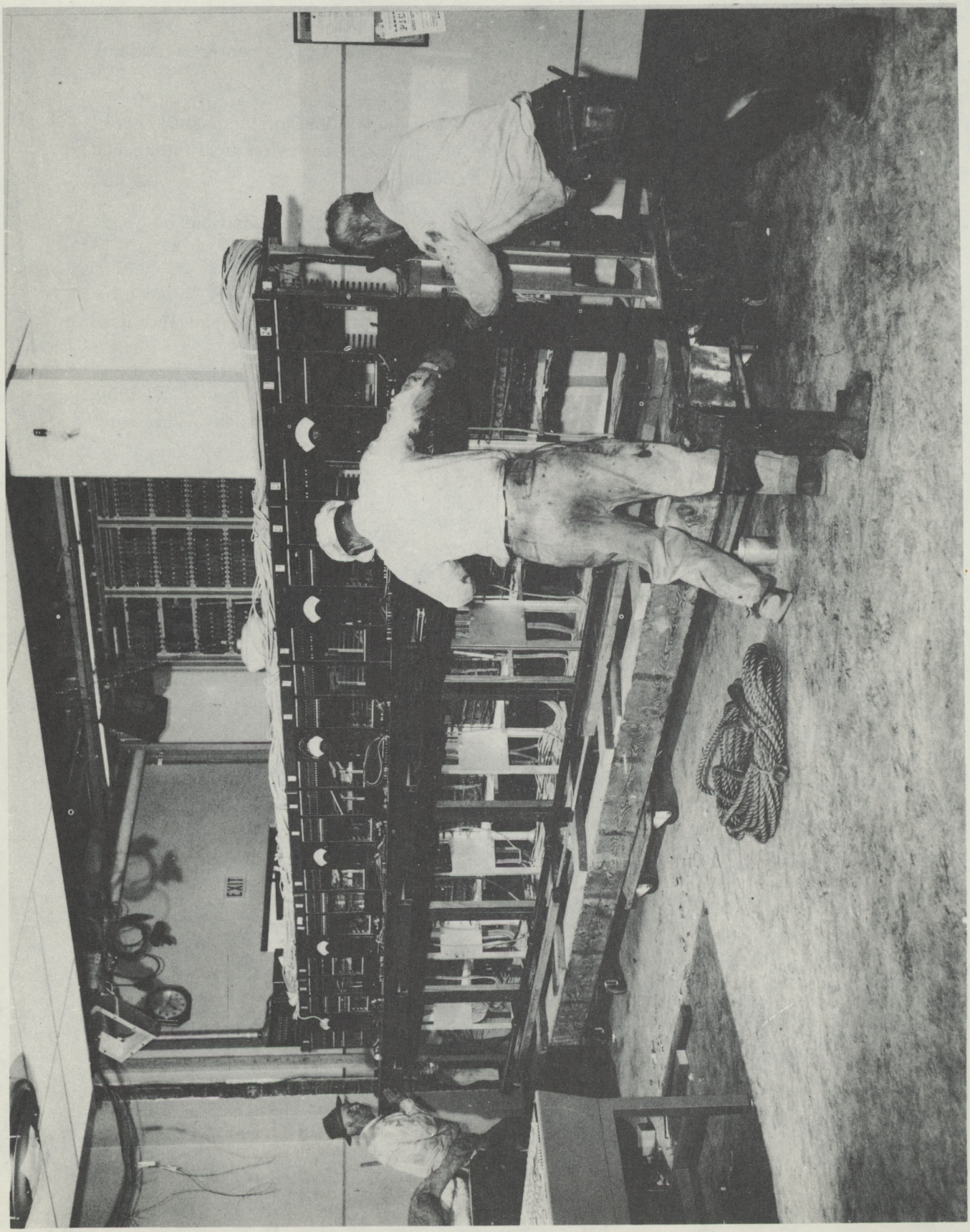
The Pacific Telephone people recently relocated a plant service center at Oakland, California with a minimum "out of service" time.

Confronted with requirements for additional floor space for No. 1 crossbar central office equipment, it was necessary to relocate the plant service center from the second floor to the fifth floor of the East Bay Kellogg Building.

The major portion of this job consisted of physically moving six positions of No. 14 local test desk.

The test desk was moved under one operation. This was accomplished by securing the desk to two 10 x 12-inch oak skids. A permanent boom and a mobile crane were used in the hoisting operation.

All switchboard cables to the desk were cut at 4:30 P.M. on Friday July 29, 1960, and all 6 positions were back in service 8:00 A.M., the following Sunday. This move included the installation of a complete new test trunk multiple.



MOVING A TEST DESK ? (CON'T)